The Orchadian

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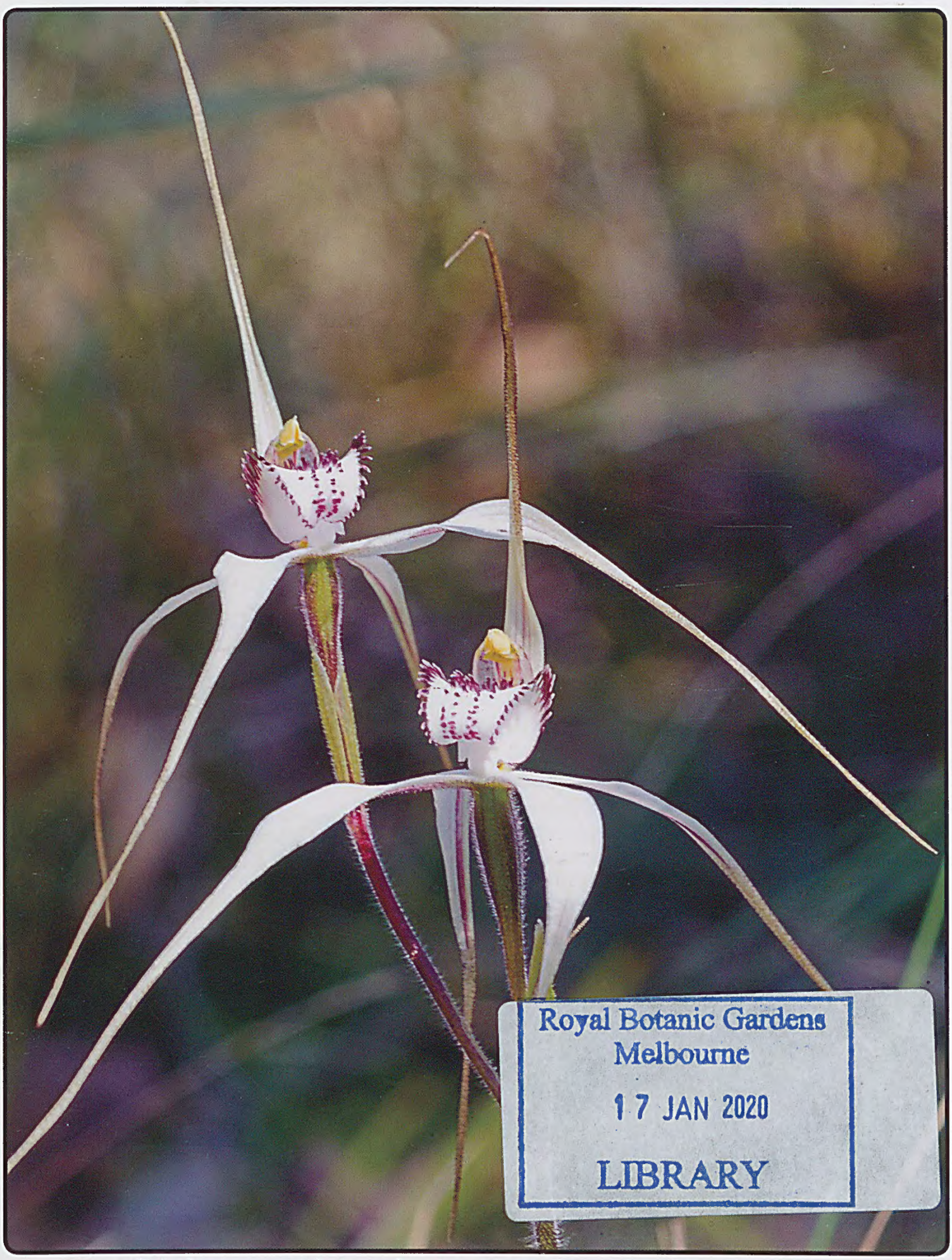

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Caladenia saggicola 'pure form', southeast Tasmania. Photo Peter Fehre

The Orchadian

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Editorial

Natural hybridisation is relatively common in Australian terrestrials and some epiphytes, especially *Dendrobium* sections *Dendrocoryne*, *Rhizobium* and *Spatulata*. For reasons that are poorly understood, natural hybrids in some regions of the world are rare, for example in dendrobiums of Asia (Tony Lamb, pers.com.). In this issue Mark Wapstra and his Tasmanian associates report on natural hybrids and likely pollination strategies in *Caladenia* in their state, where the genus has 35 species including some endemics.

The Rise in Australian Hybrid Breeding

The history of breeding of Australian hybrids provides some reasons for the relatively large number of articles on hybrids now published in *The Orchadian*. It represents a fairly recent trend. The early issues to the late 1970s (Vol. 1–7) focussed on individual species, field trips, culture, classification and descriptions of regional flora, species and some natural hybrids. Artificial hybridisation had barely commenced in Australia, although there some registrations from overseas activity. From 1977, some Australian registered hybrids were listed in the journal and crosses were being made. The first wave of hybridists in the listings were J.E. Rumrill, V.F. and C.N. Jupp, D.M. Cannon, R. Bedford, W. Upton, and L.T. and M.K. Nesbitt (terrestrials). The listings increased in number in the 1980s, and the first brief notes were in Vol. 7 No. 5 1982 under 'Notes from the Hybridizers' by Sid Batchelor and David Cannon. There were short articles in 1990 on terrestrials (Les Nesbitt) and *D. fleckeri* hybrids (R. Shooter).

Walter Upton wrote the first substantial report on hybrids in Vol. 10 No. 4 1992, following publication of his classic '*Dendrobium Orchids of Australia*' in 1989. In the 1990s articles on hybrids increased rapidly in association with a large upswing in registered hybrids, and increasing numbers of colour photos were published. We have now reached a stage where hybrid lines have been established and exhibited in perhaps most of the Australian non-terrestrial genera expected to produce quality hybrids. The results can now be assessed, with some consideration of future work, and these are good reasons why articles on hybrids are being submitted. It is unfortunate that there are too few articles on the work of many of the early hybridisers, although there are potential authors who knew them well.

So, there are more accounts of hybrid breeding in this issue. David Butler has had good success in identifying and using parents that can produce quality progeny, a difficult skill to develop. It is now a challenge to identify suitable parents from

the plethora of available hybrids, and to develop new directions in breeding. How far should a line be pursued, and how much dominance is wanted from one species, for example *D. speciosum*? The more recently produced outstanding *D. speciosum* style hybrids are now developing into mature plants, and I have attempted to analyse a small sample from the 2019 Speciosum Spectacular at Kempsey, where they have been exhibited over several years. Roslyn Capell has written a short article on a different aspect, involving *D. fleckeri*. The *D.* 'Big Foot' plants are hybrids, and their likely identity is reviewed, as they are sometimes mistakenly exhibited as *D. kingianum*, and unfortunately used in breeding line bred *D. kingianum* and hybrids. Grahame Muller has an interest in searching historical aspects of Australian orchids, and has discovered an earlier record of three *Dendrobium* taxa described by F.M. Bailey who was the Government Botanist for Queensland.

The photos (P.A.) on this page, including an unusual intersectional *Dendrobium*, are from events of the 2019 season.

Peter Adams

Rhinochilus Colonial Zeal

Rhinochlus Aussie Passion

Dendrobium schneiderae x *gracilicaule*

President's Report

Recently there have been devastating bushfires in New South Wales and Queensland, and some wild destructive weather that has challenged growers and their plants, and the extent it has damaged orchid rich areas is unclear as yet. Our thoughts go out to members who may have been affected. We have also had a flowering season described in some regions as poor or ordinary, for reasons that are unclear. Since the last issue we have learned of the passing of two notable ANOS members with long records of service.

Murray Corrigan was inaugural Editor of *The Orchadian* from 1963, and continued in the role for many years. He served on ANOS Council in the initial period when the society was establishing, and I invite those who knew him well to compile a contribution for *The Orchadian* to recognise and celebrate his service. Jim Lykos served on ANOS Council and was the New South Wales Regional Registrar of Judging.
Murray Corrigan set out the Objectives of ANOS in *The Orchadian* Vol. 1 No. 1. They have not essentially changed in 56 years, a tribute to the foresight of the first ANOS council.

The Objects of the Society shall be:

1. To promote the appreciation, culture, and propagation of Australian and Australasian native orchid species and hybrids.
2. To promote the conservation of Australian and Australasian native orchid species and natural hybrids, and, in particular, to assist in the preservation of those species and natural hybrids in their natural habitat.
3. To promote the scientific and cultural knowledge of Australian and Australasian native orchid species and hybrids.
4. To print and publish any pamphlet, book, periodical or other communication which the Society may consider desirable for the furtherance of its objects.
5. To establish and maintain standards for the judging of Australian and Australasian native orchid species and hybrids and to train judges to apply these standards.
6. To establish and maintain awards for Australian and Australasian native orchid species and hybrids.
7. To organise and promote and support conferences and shows featuring Australian and Australasian native orchids.
8. To subscribe to or become a member or associate of any other organisation with similar objects.
9. To subscribe to any charity and make donations for any public or charitable purpose as deemed appropriate by Council
10. To do all such other lawful things incidental or conducive to the attainment of these objects.

Some of the objectives have been taken up by local ANOS groups who now operate with much independence from the parent body, to an extent that the relevance of ANOS Inc. is sometimes questioned. ANOS Inc. is still actively concerned with promoting the objectives through promoting and reporting on conservation activity, maintaining judging standards and a register of national awards, and promoting growing and breeding of a wide array of orchids.

The production of *The Orchadian* is a key and vital role of ANOS Inc. It has an international distribution, and there is a need for individual groups and more members to contribute to the journal and newsletter, and to encourage subscriptions from members. There is a major challenge to increase interaction and relevance to the wider Australian community by expanding on-line information about our activities, and this has been commenced with the newsletter and Facebook page. At this time, printed information is still valued by members and offers a permanent record.

I hope all members and their families are safe from recent adverse events, and are looking to repotting and refining their collection. I wish you all a better season in 2020.

Peter Adams

Hybrids Within *Caladenia* R.Br. in Tasmania

Mark Wapstra, Nigel Swarts, Geoff Curry and Peter Fehre

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Summary

Natural hybrids in *Caladenia* R.Br. *sens. lat.* from Tasmania are documented. These include hybrids between *Caladenia caudata* and *Caladenia saggicola* (two Commonwealth- and State-listed threatened species), *Caladenia carnea* and *Caladenia dienema* (a widespread small-flowered "finger-orchid" and a narrow-range endemic "spider-orchid"), and *Caladenia carnea* and *Caladenia alpina* (members of the "*Petalochilus*" and "*Stegostyla*" subgenera). The possible pollination mechanisms are explored. The conservation and management significance of the hybrid entities is discussed.

Introduction

Tasmania supports 35 species of *Caladenia* R.Br. (Jones 2006; Jones et al. 1999; Jones et al. 2001; de Salas & Baker 2018; Backhouse et al. 2019), of which 20 belong to the small-flowered "alliance" comprising the sometimes-segregated genera of *Caladenia* (1 species in Tas.), *Petalochilus* (12 species in Tas.), and *Stegostyla* (7 species in Tas.), with the balance the large-flowered spider-orchids, sometimes attributed to *Arachnorchis* or *Calonema* (Hopper & Brown 2000). Hybridisation within the broader *Caladenia* genus is well-documented (e.g. Jones et al. 1999; Jones 2006; Backhouse et al. 2019) but in Tasmania there has been no formal documentation of this beyond anecdotal reports. In this paper, we examine the occurrence of hybrids within *Caladenia* in Tasmania.

Hybrid Entities

Caladenia caudata Nicholls × *Caladenia saggicola* D.L.Jones

Caladenia caudata is endemic to Tasmania and is widespread but often highly localised, generally with a near-coastal distribution in open woodland with a high degree of insolation (e.g. Jones et al. 1999). *Caladenia saggicola* is highly localised, effectively restricted to a single population (Map1) on private property in southeast Tasmania (one other site supports one individual), where it occurs in *Eucalyptus viminalis* forest on deep sands (e.g. Jones 1998; Jones et al. 1999). Both species are listed as threatened on the Tasmanian *Threatened Species Protection Act 1995* (TSPA) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBCA). The population of *C. saggicola* has been subject to long-term demographic monitoring, primarily undertaken by Threatened Plants Tasmania (Wildcare Inc.) supported by the Tasmanian Department of Primary Industries, Parks, Water & Environment (DPIPWE) and the landowner. At this site, the species co-occur and while most can be allocated to a species, several individuals display morphological features of both species (Figures 1–5).

Over the last 10 years of monitoring orchids on this site, observers have noted initially subtle, and more recently obvious, colour variants illustrating the impact of *Caladenia caudata* on *Caladenia saggicola*. Without agreed characteristics it is difficult to nominate exact numbers of *Caladenia saggicola* being impacted but the level of noticeable change may be in the order of 5–10%.

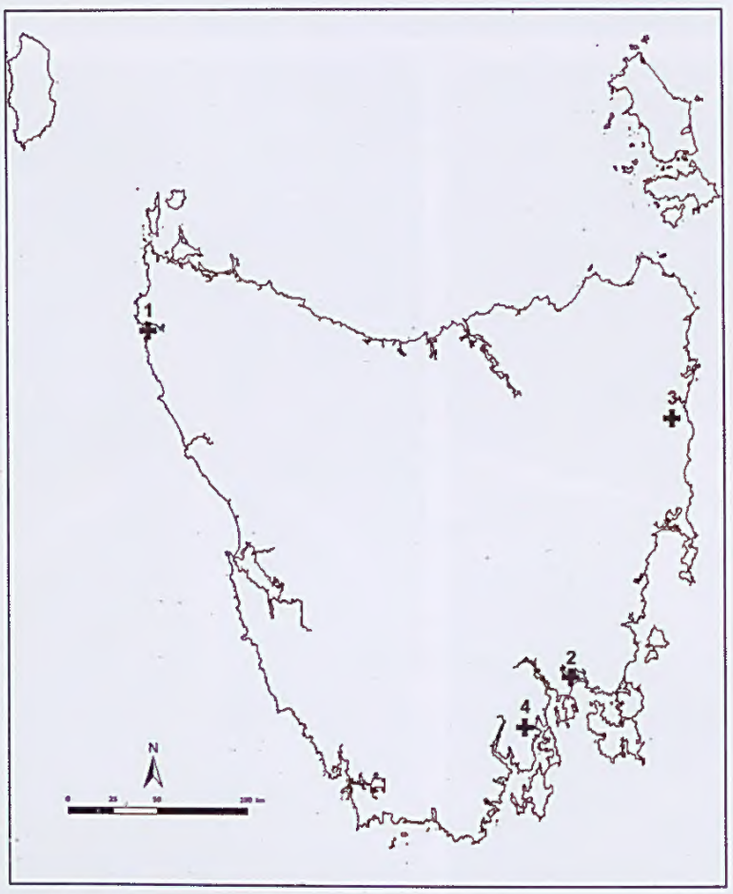
Caladenia carnea R.Br. × *Caladenia dienema* D.L.Jones

The Arthur-Pieman area of Tasmania refers to a broad band of near-coastal, mainly reserved, land

Figures 1–5. Variation in the population of *Caladenia saggicola*.
TOP: LHS – *Caladenia caudata* (quite typical form of the species for southeastern Tasmania – note the deep red colouring, glandular perianth segments, wide but relatively short coloured perianth segments, "tailed" labellum apex); RHS: - "pure" *Caladenia saggicola* (note the bright white colouring, large flowers with long perianth segments that are sparsely glandular).
BOTTOM: various examples of hybrid individuals showing different degrees of morphological variation in different flora parts.

on the state's west coast approximately between Marrawah and the mouth of the Pieman River. The area is a well-recognised "orchid hotspot", supporting several narrow-range endemics, several of which are listed as threatened on both the TSPA and EPBCA. Threatened orchids in the region are subject to informal monitoring and extension surveys, mainly undertaken by Threatened Plants Tasmania (Wildcare Inc.) supported by DIPIPWE. The area is also frequented by numerous orchid enthusiasts who principally document the flora through digital photography and social media.

In 2012, a hybrid individual was reported from the Arthur Pieman Conservation Area (Map1), south of Arthur River (Figures 6–9). The hybrid has uncertain parentage, but clearly involves a large-flowered *Caladenia* (subgenus *Calonema*) and a small-flowered *Caladenia* (most likely from the *Petalochilus* group). In the general vicinity there are records of *Caladenia dienema* D.L.Jones. At the time of description (Jones 1998), the species was considered to be highly distinctive. However, subsequent surveys have shown the differentiation between *C. dienema* and *C. patersonii* R.Br. to be problematic and allocating individuals to one or the other species is now considered impractical in this part of the State. There is a relatively high diversity of small-flowered *Caladenia* species in the wider area, but *C. carnea* is considered to be the most likely candidate for parent of the hybrid individual. That species is insect-pollinated and has the largest flowers of the small-flowered *Caladenia* in the area.



Map 1. Locations of hybrids described in text:
(1) *Caladenia carnea* × *Caladenia dienema* south of Arthur River;
(2) *Caladenia caudata* × *Caladenia saggicola* in southeast Tasmania near Hobart;
(3) *Caladenia alpina* × *Caladenia carnea* from South Sister;
(4) *Caladenia alpina* × *Caladenia carnea* from Snug Tiers.

Subsequent searches for the hybrid have failed to detect the individual or novel sites. At this stage the hybrid is considered a short-lived possibly sterile occurrence (pollen presence not checked), and formal recognition is not considered warranted. Hybrids between the large- and small-flowered *Caladenia* species are frequently reported from mainland States (e.g. Backhouse et al. 2019, and references therein) and it is surprising that they are not more often observed in Tasmania.

Caladenia alpina R.S.Rogers × *Caladenia carnea* R.Br.

Prior to the present documentation of this putative hybrid entity, hybrids between subgenus *Stegostyla* and *Petalochilus* in Tasmania had not been reported. In fact, such hybridisation between these two species-groups appears rare in Australia, with Backhouse et al. (2019) only citing Kuiter (2010) in relation to a hybrid between *Caladenia* (syn. *Petalochilus*) *carnea* and *Caladenia* (syn. *Stegostyla*) *cucullata*. Comments on images of the hybrid posted on the Tasmanian Native Orchids public Facebook group did not result in further sites being identified but rare hybrids between *Stegostyla* and *Petalochilus* in Victoria were noted (R. Austin pers. comm.).

In late 2018, putative hybrids between *C. alpina* (or *C. cracens*) and *C. carnea* (or *C. vulgaris*) were documented at two disjunct sites in Tasmania: (1) Snug Tiers in southeast Tasmania (Map1); and (2) South Sister near St Marys in central eastern Tasmania (Map1). The perianth segments tend to be blunter and wider than

Figures 6–9. TOP ROW. hybrid individual with perianth segments and labellum intermediate between a large- and small-flowered species (26 Oct. 2012); RHS – *Caladenia carnea* from the general vicinity (note that this is a highly variable species in Tasmania).
BOTTOM ROW. LHS – typical *Caladenia carnea* from the Arthur-Pieman area, Black Bull Scrub (30 Oct. 2008); RHS - "good" *Caladenia dienema* from the type location of Rebecca Creek (31 Oct. 2008) i.e. a typical spider-orchid that occurs in the general vicinity of the reported hybrid but note in-text discussion of distinction between *C. dienema* and other members of the *C. patersonii* species-complex.

Figures 10–14. Snug Tiers (26 Nov. 2018):

TOP ROW: LHS – "good" *Caladenia vulgaris* from immediate vicinity of putative hybrid (note the elongated ovary, narrow perianth segments, shortly triangular but non-glandular labellum apex, and dorsal sepal that is not "hooded" but arches over the column);

MIDDLE – *Caladenia carnea* from immediate vicinity of putative hybrid (relatively typical colouring, erect dorsal sepal, rounded lateral lobes of labellum); RHS – "good" *Caladenia alpina* from immediate vicinity of putative hybrid;

BOTTOM ROW – putative hybrid individuals showing deeper pink colour, labellum apex somewhat between the two species and a semi-hooded dorsal sepal that is glandular.

typical *C. carnea* but not so wide and rounded as in *C. alpina*. The dorsal sepal is semi-hooded in the hybrid, intermediate between the distinctive hooded dorsal sepal of *C. alpina* and the more erect dorsal sepal of *C. carnea*. The labellum is more typical of *C. carnea* in terms of calli colour and arrangement, but the apex is broader and more triangular (i.e. closer to *C. alpina*).

At both sites, the putative parents were present with a small number of apparent hybrids (refer to Figures 10–14 for the Snug Tiers sites and Figures 15–18 for the South Sister site). Note that *C. vulgaris* D.L.Jones was also present at both sites, and the putative hybrids show some features of this species. Jones et al. (1999) and Jones (2006) considered Tasmanian populations of *Caladenia vulgaris* to be self-pollinating, noting that "flowers [have] prominent long ovaries, are short-lived and self-pollinating, sometimes without opening". Another reason that *C. carnea* is suspected as a parent in both cases is that the hybrid individuals are deep pink, much more akin to typical *C. carnea* than *C. vulgaris*, the latter usually dull pale pink to whitish. All that said, totally discounting *C. vulgaris* as a parent is not possible and further observations are sought.

Caladenia alpina is widespread at mid- to high elevations in Tasmania, generally occurring in higher rainfall habitats (e.g. Jones et al. 1999). The species is considered distinct from *Caladenia cracens* D.L.Jones, which is usually a species of lower elevations and drier forests. Morphologically, the species are apparently distinct, with leaf width, labellum calli and number of flowers being distinctive. However, more recently, the gradation between the two species in terms of habitat and morphology has been recognised (M. Wapstra and G. Curry pers. obs.), which will be explored in greater detail elsewhere. Note that at the South Sister site, *C. alpina* and *C. cracens* were both present within metres of one another, and *C. cracens* occurs on the lower elevation parts of the Snug Tiers. We do not discount *C. cracens* as a putative parent at this stage, and further observations are sought.

Caladenia carnea is also widespread, occurring from near sea level to mid-elevations (in Tasmania this refers to elevations between c. 300–700m above sea level)), in a wide range of vegetation types. While it is typically a spring-flowering species (Wapstra 2018), at several sites, especially higher elevations such as Snug Tiers and South Sister, flowering can extend into summer. This late flowering of *C. carnea* was particularly evident in 2018 at several sites (M. Wapstra pers. obs.), perhaps explaining why the hybridisation event was first recorded in this year. *C. carnea* was infrequent but widespread in the South Sister (St Marys) site in 2018 but was apparently restricted to one individual at the Snug Tiers site in 2018, and not documented previously from this elevation at this general location (G. Curry pers. obs.).

It is likely that this hybrid entity has been overlooked, perhaps due to the wide variation observed in populations of the *Caladenia carnea* species-complex.

Discussion

Pollination mechanisms in relation to the Tasmanian hybrids

The *Caladenia* genus is unique in that it utilises a range of strategies for flower pollination. When coupled with weak post-zygotic barriers even between subgenera within *Caladenia*, it is no surprise that hybrids such as those described herein are observed from time to time.

One pollination strategy used by many *Caladenia* species is sexual deception where long-distance attraction of male thynnine wasps is through the release of the sex pheromone of the female wasp. The sex pheromone is typically emitted from glands on the sepals and petals (Stoutamire 1983), but in some species is also released from the labellum. This strategy is used by most of the red and green-flowered *Caladenia* species (Phillips et al. 2009), and is the most likely strategy utilised by *C. caudata* (Gaskett 2011).

Male thynnid wasps have been captured in pollinator-baiting experiments using *C. caudata* flowers (Swarts pers. obs.), however, the exact identity of the wasps is still unknown. The strategy of sexual deception is associated with a very specific one-to-one relationship between orchid and wasp species (Phillips et al. 2017). In contrast, another common pollination strategy

Figures 15–18. South Sister (26 Nov. 2018): LHS – "good" *Caladenia vulgaris* from immediate vicinity of putative hybrid; MIDDLE – putative hybrid individual showing deeper pink colour, labellum apex somewhat between the two species and a semi-hooded dorsal sepal that is glandular; RHS – "good" *Caladenia cracens* from immediate vicinity of putative hybrid; BOTTOM: individuals of all three entities from the same site (left to right: hybrid, *C. cracens*, *C. vulgaris*). Note: images of *C. carnea* and *C. alpina* from this site were not taken.

used by many *Caladenia* species, particularly the white and pink-flowered orchids belonging to the *Calonema* subgenus (Faast et al. 2009; Phillips et al. 2009), is food-advertising (or food-deception) where flowers attract visitors through the promise of food (Stoutamire 1983; Bates 1984). Initial work has suggested that this strategy is much more generalised, attracting a broad spectrum of insects including native bees, honeybees, syrphid flies, calliphorid flies and solitary wasps (Reiter et al. 2018a). Visiting insects exhibit a food-foraging behaviour on the flower, which can lead to pollination (Faast et al. 2009). This is the proposed strategy for *C. saggicola*, however, confirmation of food-deception and the insects responsible for pollination is difficult due to low visitation rates of pollinators. In addition, this method requires direct observation of pollen transfer from the anther of one plant to the stigma of another conspecific flower (Adams & Lawson 1993).

Hybrids between sexually-deceptive and food-advertising spider-orchids, particularly those belonging to the subgenus *Calonema*, are common throughout most of the geographic range of the subgenus (Hoffman & Brown 1998; Hopper & Brown 2001; Backhouse 2011). The most likely scenario for this to occur is that a wasp that has been tricked into visiting the sexually-deceptive flower collects pollen and transfers it to the food-advertising flower in its quest to find food. It is possible that occasional food-seeking insects may visit some sexually-deceptive species, which could also lead to hybridisation, though this has been poorly documented.

New research has identified a pollination mechanism whereby *C. colorata* flowers are pollinated by nectar-foraging thynnine wasps (Reiter et al. 2018b). In observation of wasp behaviour approaching the flower, Reiter et al. (2018b) found that initial attraction was typical of odour-tracking behaviour. However, wasps that landed on the labellum attempted to feed rather than copulate. Reiter et al. (2018b) demonstrated that *C. colorata* produces nectar on the labellum surface, a similar finding to Faast et al. (2009) on another closely-related white-coloured spider-orchid *C. rigida*. Whilst research to investigate nectar production on *C. caudata* or *C. saggicola* (both belong to the same *C. patersonii* species-complex as *C. colorata* and *C. rigida*) is yet to be conducted, the possibility exists that hybridisation could occur if the same thynnine wasp was responsible for pollinating both species through two different pollination strategies (Reiter et al. 2018b).

The hybrid between the small-flowered *C. carnea* (subgenus "*Petalochilus*") and the large-flowered *C. dienema* (subgenus *Calonema*) is likely to result from pollen transfer between the two parents by a food-deceived insect. Various species of small native bees have been confirmed as pollinators for *C. carnea* (Farrington et al. 2009; Phillips et al. 2009) and Kuiter (2016) suggested that small flies may be involved. Given that there is substantial floral colour diversity in *C. dienema* ranging from white through to red/green this is not surprising as the lighter-coloured flowers can have the appearance of food-advertising. Further research investigating nectar production from *C. dienema* may also offer explanation as to the attraction of native bees to large-flowered spider-orchids such as *C. dienema*.

Hybrids between *C. alpina* (subgenus *Stegostyla*) and *C. carnea* also reflect compatibility across sub-generic boundaries and most likely the movement of pollen from one food-deceptive species to another. *Caladenia alpina*, with its long-lived and quite widely open flowers, is presumed to be insect-pollinated although a pollinator has not been identified.

One post-pollination mechanism that may prevent the successful establishment of hybrids is high levels of mycorrhizal specificity, seen particularly in *Caladenia* (Swarts et al. 2010; Phillips et al. 2016). While closely related species of *Caladenia* typically share mycorrhizal fungi, the sub-"genera" show differences in fungal use (Phillips et al. 2016). As such, this may prevent a barrier to recruitment of hybrid plants if the hybrid genotype is less effective with either of the two fungal species. No work to our knowledge has addressed the mycorrhizal associations of hybrids.

Conservation management implications

Hybrids between non-threatened (widespread and often locally common) species such as *C. alpina* and *C. carnea* are of academic interest but of very low conservation significance in any formal sense. That said, documenting such entities is considered important, both descriptively (such as herein) but also through formal herbarium vouchers (which has been undertaken for the *C. alpina* × *C. carnea* entity from both sites).

However, where hybrids involve at least one putative parent that is listed as threatened under State and Commonwealth legislation, the interest is more than academic and from a conservation perspective is not to be underestimated. For example, in the present difficulties in accurate identification of the endangered *C. dienema* from the more common (but still formally listed) *C. patersonii*, it is very likely that hybridisation has played a significant role in the huge colour variation seen across both species. It has become a practical impossibility for field workers to identify the large-flowered spider-orchids in the Arthur-Pieman area, with most individuals now simply being referred to as "*Caladenia patersonii* species-complex". There is a potentially significant loss of distributional, ecological and demographical data as a consequence.

With renewed conservation focus on *C. saggicola* and *C. caudata*, already introgression between species through hybridisation can add a layer of difficulty to monitoring efforts, collection and storage of seed from "true" species as well as the future integrity of species boundaries. Given the conservation status of the parent species, most notably *C. saggicola* that is listed as Critically Endangered on the EPBCA, and the highly restricted area occupied by the parent and hybrid individuals, natural hybridisation is of concern if it could lead to the complete genetic swamping of *C. saggicola*. The species is only known from one other individual at one other location, where it also occurs with *C. caudata*, which is by far the most abundant species at that site, meaning we do not have the luxury of insurance populations as we do with *C. caudata* (much more widespread and known from c. 30+ subpopulations).

Whether active intervention is warranted is a philosophical question that is difficult to address. While the habitat of *C. saggicola* has been alienated (mainly lost to coastal development such as housing, an airport and golf courses), there are no historical records to indicate a historically broader occurrence, suggesting the species is a narrow-range endemic. As a minimum, it is recommended that the presence of hybrid individuals continues to be documented. It is also recommended that the hybrid *Caladenia caudata* Nicholls × *Caladenia saggicola* D.L.Jones be recognised in *A Census of the Vascular Plants of Tasmania, including Macquarie Island* (de Salas & Baker 2018). At present, the hybrid entity is recognised by Backhouse et al. (2019). Furthermore, the TSPA can include hybrids on schedules of the Act (viz. *Cyathea australis*×*Cyathea cunninghamii*, formally known as C. × *marcescens*), and this may provide more formal recognition of the collective conservation importance of the hybrid population (including "pure" parents and "mixed" offspring).

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Geoff Curry is a tour guide specialising in Tasmanian native orchids, executive member of Threatened Plants Tasmania (Wildcare Inc.) and Conservation Office of ANOS Inc.

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The Origins of *Dendrobium* 'Big Foot'

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Summary

Confusion has continued about the origin of *Dendrobium* 'Big Foot', and it is often labelled *D. kingianum*. The likeliest explanation of the production of large growing plants with silcockii style flowers is that when the cross was made by David Mitten in New South Wales, pollen from both *D. kingianum* 'Big Foot Mother' and an adjacent plant of *D.* Gillian Leaney 'Breeder' contributed pollen to the pod parent plant. This produced mixed progeny of *D. kingianum* and *D.* Bicentennial Rose seedlings. The hybrid is distributed in many collections, and is exhibited and sometimes used in breeding, creating problems for growers and registered hybrid lists. These plants should not be judged in the *D. kingianum* class. Dendrobium 'Big Foot' is not an officially registered hybrid name.

Introduction

Plants of *D.* 'Big Foot' are exhibited and bred as *D. kingianum* despite considerable evidence demonstrating that they are hybrids (Adams 2006), as many newer growers are unaware of this and some older growers have not changed their labels. There are many growers who collect line bred *D. kingianum* seedlings for exhibiting, and some breeders are using line bred *D. kingianum* plants to make advanced hybrids. David Mitten, the breeder, made a straight cross of two selected *D. kingianum* plants but obtained a mixed result of seedlings. This update is to inform growers and strongly advocate for line breeding and hybrid breeding that is not contaminated by these misidentified plants.

History

In 1986 David Mitten crossed two *D. kingianum* seedlings. These were later named *D. kingianum* 'Big Foot Mother' (which has the parentage *D. kingianum* ('Big Red' x 'White Lip') x 'Lipstick'), and *D. kingianum* 'Big Foot Father', a natural plant from Gloucester, New South Wales. The pod parent, a seedling made by Ken Russell, had well shaped splash purple flowers which were almost white except for the segment tips, and was a slow grower. The pollen parent was a short-caned plant with purple flowers and a large speckled purple and white labellum (Adams and Lawson 1995). It was collected from the Gloucester Bucketts in 1982.

The seedlings when first flowered were in two distinct groups, which I saw displayed along the sunroom windows at David Mitten's home in Charlestown, New South Wales. One group was narrow-caned, with typical mauve *D. kingianum* flowers similar to the parents. The second group, around 70%, were much larger growing plants with stout cane bases and larger, heavy textured white or almost white flowers with a predominantly deep purple labellum, often with a white stripe down the middle. They were a silcockii style (Adams and Lawson 1995), and David named the seedlings 'Big Foot', referring to the prominent, coloured labellum. The differences became more obvious when the plants reached maturity, when the second group developed tall to medium cane heights and were clearly not the progeny of the two supposed parents. The next generation of *D.* 'Big Foot' x *D. kingianum* were analysed by morphometric analysis (Adams 2006) which confirmed that the features of the plants were not within the range expected for *D. kingianum* line breeding, and were postulated to be *D.* Bicentennial Rose (*D. kingianum* x *D.* Gillian Leaney). Furthermore the putative original cross was remade and produced only typical *D. kingianum* seedlings, with none being of the silcockii style.

Likely Explanation

Discussion with David Mitten about the process of making the hybrid and inspection of his shadehouse shone light on the mystery. He performed the pollination in a small shadehouse where few other plants were flowering. There was however, beside *D. kingianum* 'Big Foot Mother' a flowering plant of *D.* Gillian Leaney

D. 'Big Foot' DM

D. 'Big Foot'

D. Gillian Leaney 'Breeder' DM

D. Gillian Leaney 'Breeder'

(D. × *delicatum* x *D. kingianum* 'Breeder'), a fertile plant that David often used in making hybrids. It has large silcockii flowers and stout canes, similar to 'Big Foot'. The original seed pod 'Big Foot' was a mixed pod, with pollen transferred by David from 'Big Foot Mother' and also pollen transferred by insect vectors from the adjacent *D.* Gillian Leaney 'Breeder'. David was initially reluctant to accept this explanation, as he had produced an attractive cross which appealed to growers, who selected the silcockii seedlings in preference to the typical *D. kingianum* ones.

Unfortunately, some growers and breeders continue to exhibit these plants as *D. kingianum* at shows, and use them for 'line bred' *D. kingianum* lines, using selected examples such as *D.* 'Big Foot' Jack McMillan.

Quality Awards for Dendrobium 'Big Foot'

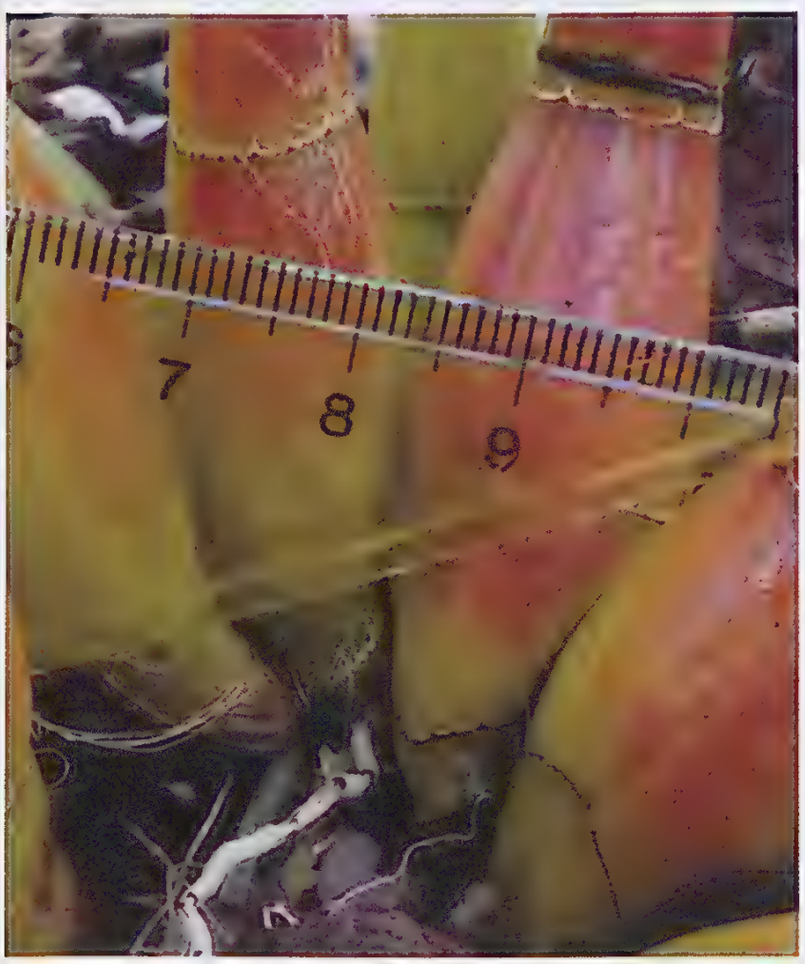
At least two plants have received quality awards as *D. kingianum*. *Dendrobium kingianum* 'Chrystal Ice' HCC/AOC was awarded at the Melbourne Showgrounds but has been removed from the award lists on the AOC website. *Dendrobium kingianum* 'Valdon' HCC/AOC was also awarded the 1997 Bill Murdoch Trophy for Best Australian Species in *The Orchadian* vol. 12:7 March (Rudkin 1998). Crosses of *D.* 'Big Foot Valdon' x *D. kingianum* have been exhibited at shows as *D. kingianum* as recently as October 2018 in Tasmania. Most judging panels now recognize them as hybrids and will not judge them as a species, but sometimes the correct identification is not picked up.

Identification

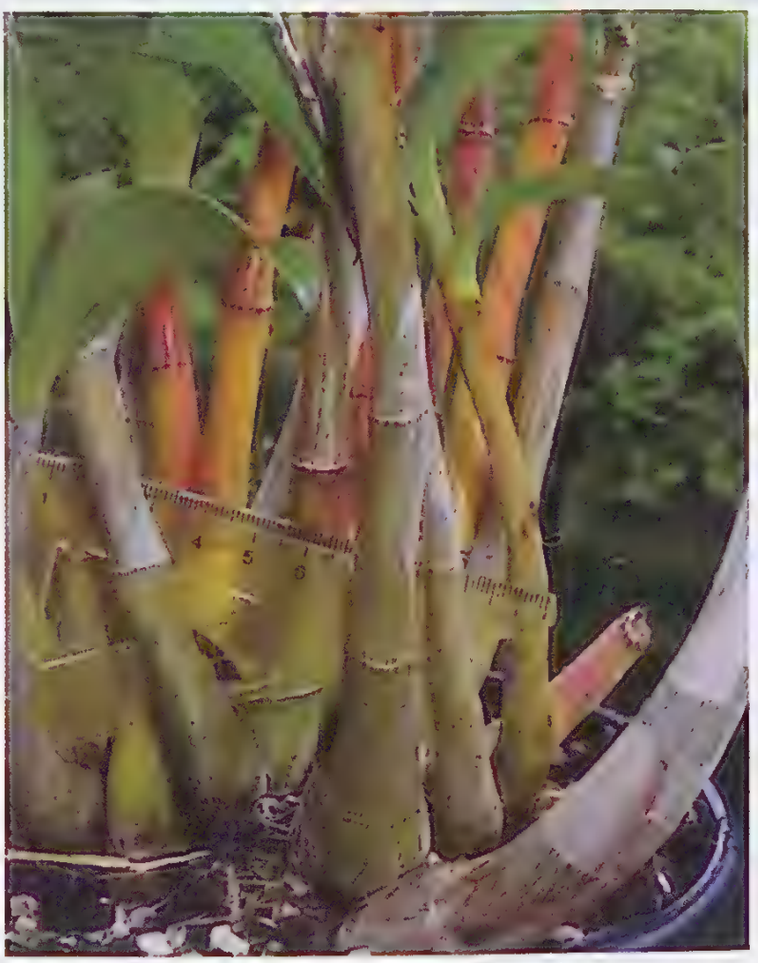
Dendrobium 'Big Foot' crosses are similar to *D.* Bicentennial Rose plants, although the silcockii flower is distinctive, as it is in *D. kingianum*, making it appear a little different from others of this grex. David Mitten made and registered *D.* Bicentennial Rose in 1989. It has 87.5% *D. kingianum*. *Dendrobium* 'Big Foot' seedlings are usually identified by tall, stout cane bases and very robust, thicker stems than *D. kingianum*. The flowers have longer petals and a different labellum shape (Adams and Lawson 1995 p.18). All these features are consistent with a contribution by *D. speciosum* (12.5%).

Sources

I have observed a collection of plants and taken photographs of the crosses (see photographs) over the past 20 years. All of these plants were



D. 'Big Foot' DM



D. Gillian Leaney 'Breeder'

D. kingianum 'Chrystal Ice'

D. 'Big Foot' Jack McMillan

D. kingianum 'Jeckles' x '*D.* 'Big Foot Valdon'

D. 'Profusion Rosie'

D. Gillian Leaney 'Breeder'

D. kingianum 'Jeckles' x '*D.* Big Foot Valdon'

sourced from David Mitten, with his handwritten labels, and from his friend Jack McMillan. The plant *D.* Gillian Leaney 'Breeder' has the annotation 'solid purple lip', which is not a strictly accurate description as it has some white bars. The plants of *Dendrobium* 'Big Foot J. McM.' No.1 and No.2, and *D.* 'Big Foot' labelled 'DM' and other progeny mainly have very dark purple labellums.

Next Generation

Seedlings of *D. kingianum* x *D.* 'Big Foot' (*D.* Rutherford Bluetongue) have been studied (Adams 2006) and this cross has been repeated by others, notably in Victoria and Tasmania. They have a background of 93.75% *D. kingianum* and are almost indistinguishable from the species. They may have slightly longer petals and more robust canes, and often form short, rather stunted plants. The flower colour is usually mauve and I have not seen a true silcockii colour. The plants have been distributed commercially and are in many collections, and are found on the showbench, especially in Tasmania up to the present. More details of this generation are in Adams (2006).

Discussion

Identification of *D.* 'Big Foot' as the hybrid *D.* Bicentennial Rose has become clear as plants reached maturity and showed characteristics outside the range of line bred *D. kingianum*. The original cross was made by David Mitten in good faith, and some attractive hybrids which resulted are likely to be conserved in collections. Insect pollination is common in orchid houses, often by *Syrphid* hover flies and *Trigonula* bees (native stingless bees) in areas north of Sydney. Screening or isolation of pollinated plants in breeding programs after artificial pollen transfer will prevent unwanted insect pollination.

It is very important that judges and growers are able to recognize *D.* 'Big Foot' and other *D. kingianum* hybrids that are incorrectly identified as the species. Breeding programs rely absolutely on correct identification and provenance. Once progeny are made from misidentified plants this error passes onto subsequent generations in line bred *D. kingianum,* and when hybrids are made and registered with RHS, the effect of incorrect parentage continues. David Mitten produced other attractive *D. kingianum* style hybrids including *D.* Bicentennial Blush (*D.* Gillian Leaney x Kim). He and his wife Rosemary were great supporters in the research that led to the production of the monograph *Dendrobium kingianum, a unique Australian orchid* (Adams and Lawson 1995).

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Parents from my Past – A *Dendrobium* Story

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Interest in growing and exhibiting Australian dendrobiums is flourishing, with a strong revival of the older, large yellow hybrids such as *D.* Avril's Gold. Shunned by many growers for being too 'slow', when grown under modern cultural methods these robust plants are worthy of a place in the best of collections. Particular plants that grow well and have exceptional floral characteristics may be given cultivar names and selected as parent plants in further hybridising. An insight into the breeding of these big yellow-flowered hybrids and the careful selection of parents may be found in reading *Good Things Come in Threes* (*The Orchadian* September 2014).

During a recent discussion on native hybridising I was asked about the highlights of my *Dendrobium* breeding program. There was no quick answer, but it did give me cause to reflect on the two hundred or so *Dendrobium* hybrids I had made, and of the particular parents I used to make them. Putting to one side my breeding of the robust yellow hybrids, there were a host of others in a variety of forms, flower colour, and plant habit which made my many years of *Dendrobium* hybridising so satisfying.This is the story, in no particular order, of six of the parents I used and of their hybrid offspring.

Dendrobium Yondi Sunshine 'Orange'

When Sid Batchelor made the crossing of *D.* Eureka x Lynette Banks, he was no doubt seeking lots of colour, being mindful that the resulting hybrid would be 38% *Dendrobium fleckeri*, a species noted for its strong influence in the breeding of yellow/orange flowered progeny. A seedling I obtained of the cross flowered a strong orange colour, and when the hybrid was registered as *D.* Yondi Sunshine, I gave the seedling the cultivar name 'Orange'. This was rather an understatement, the actual colour being ever so much stronger than Sid could ever have expected. Quickly becoming part of my *Dendrobium* breeding program, *D.* Yondi Sunshine 'Orange' was the pod parent in eight crosses, but never produced similarly coloured offspring. The progeny, however, were hardly a disappointment, for when *D.* Yondi Sunshine 'Orange' was crossed with yellow-flowered parents, most of the seedlings flowered a strong yellow colour, many with overtones of orange/gold, and all highly desirable. Whether large and flat or small and cuppy, these flowers demand attention, as in the hybrids which were grown and named by Peter Miller - *D.* Coolart Gold (*D.* Yondi Sunshine 'Orange' x Gracillimum 'Mel') and *D.* Coolart Sunshine (*D.* Yondi Sunshine 'Orange' x *speciosum* 'Windermere').

Dendrobium Hilda Poxon 'Red Star'

When Sid Batchelor crossed his white *Dendrobium speciosum* 'Yondi' with his pink-lipped *Dendrobium tetragonum* '#1', he predicted the resulting *D.* Hilda Poxon flowers would have red labellums. Not only did his wish come true but the progeny, with their contrasting labellums, were consistently of a high quality, with generous racemes of beautifully coloured and marked flowers. For good measure flowering was in autumn in a time prior to the development of hot/colds, when few dendrobiums were in bloom. A seedling raised by Bernie Fletcher and named *Dendrobium* Hilda Poxon 'Red Star' combined excellent flowers, sturdy raceme habit and ease of culture. My division of the plant was used to good effect as a parent in sixteen crosses. The attractive progeny, mostly with red labellums, followed the *D.* Hilda Poxon shape and included *D.* Hilda Poxon 'Red Star' x Sunglow 'Ira' (*D.* Graeme Banks), *D.* Hilda Poxon 'Red Star' x Yondi Tina 'Goliath' FCC/AOC 1999, and *D.* Hilda Poxon ('Don' x 'Red Star').

Dendrobium Gracillimum 'Mel'

Some orchids become favourites, and in my native orchid collection this certainly applied to this plant. It originated from the crossing of two albinistic forms of *D. gracilicaule*, the best seedling of which was then crossed with *D. speciosum* 'Windermere'. The variation in the resulting progeny was interesting, notable differences being the number of flowers and

D. Yondi Sunshine 'Orange'

D. Hilda Poxon 'Red Star'

D. Gracillimum 'Mel'

D. Lorikeet 'Mel' x Yondi Tina 'Goliath'

spacing on the raceme, the size and quality of individual flowers, and most significantly the colour, which varied from weak yellow to strong gold. I raised several of the seedlings, my favourite being named *D.* Gracillimum 'Mel' after my daughter Melanie. The plant was much admired, being most floriferous, with long racemes, and an abundance of nicely spaced golden flowers. It became a parent on eight occasions, and though my quest for floriferous red-lipped yellow hybrids was never realised, I was more than happy with its offspring, two examples being *D.* Bill Dobson (*D.* Gracillimum 'Mel' x Yondi Tina 'Goliath' FCC/AOC 1999), and *D.* Coolart Gold (*D.* Yondi Sunshine 'Orange' x Gracillimum 'Mel').

Dendrobium Lorikeet 'Mel'

Previously discussed in the article '*Dendrobium* Class – an Enduring Favourite' (*The Orchadian* June 2017) as the parent of *D.* Class, *Dendrobium* Lorikeet 'Mel' was also used extensively in my breeding program on 22 other occasions. In most cases the progeny inherited red tepals and labellum from the *D.* Lorikeet parent, but crossing it with yellow flowers also introduced an interesting blend of autumn shades, as evident in *D.* Crooky. Three hybrids which displayed this welcome range of colours were *D.* Intense (*D.* Lorikeet 'Mel' x Zip 'JMCM Purple Lip'), *D.* Crooky (*D.* Lorikeet 'Mel' x *speciosum* var. *curvicaule* 'Bee Creek'), and *D.* Gelati (*D.* Lorikeet 'Mel' x Desert Rose 'Nice Pink').

Dendrobium Lustrous 'Royal Flare'

Bred by Ken Russell and purchased as a small seedling, this hybrid (*D.* Peewee x Sunglow), grew into quite a tall plant with beautiful large purple flowers. This possibly indicated that the pollen parent was the big purple-flowered type of *D.* Peewee grown and exhibited each year at the Dungog Orchid Show organised by Ken Russell. Once the hybrid was registered, my plant became *Dendrobium* Lustrous 'Royal Flare', and quickly formed part of my hybridising program as the pollen parent in seventeen crosses.

The background species of *D.* Lustrous (25% *D. bigibbum*, 25% *D. fleckeri*, 25% *D. speciosum*, 25% *D. tetragonum*) makes it a hybridist's dream, and no doubt accounts for it being a top parent. The progeny almost invariably produced a floral display of lovely, large, colourful flowers. Interestingly, flower colour intensified in following generations. *Dendrobium* Samford's Big Tina (*D.* Melbourne 'Amber' x Yondi Tina 'Goliath', registered by Cedarvale Orchids 2017), is an example. The photographed plant was grown and flowered beautifully by Chris Pegg.

The showy *D.* Melbourne (*D.* Lustrous 'Royal Flare' x Yondi Tina 'Goliath' FCC/AOC 1999) and the two unregistered hybrids *D.* Lustrous 'Royal Flare' x Riversun 'NR', and *D.* Lustrous 'Royal Flare' x Ray's Spot 'Superb', were all bred by me, and are plants worthy of a place in the best native orchid collection.

Dendrobium Stunning 'Red Lip'

My first sight of a flower of *Dendrobium* Stunning 'Red Lip' was in Don Cruickshanks' bush house. The shapely flower, with its vibrant purple labellum, must have really stirred the hybridist in me, as I was given the plant to take home. Of the three hybrids produced, the unregistered hybrid *D.* Stunning 'Red Lip' x Ray's Spot 'Superb' is the most successful, and justified my initial enthusiasm. The seedlings flower in colours from solid purple through to white with purple highlights, but not all inherited the parent's striking purple labellum, a trait which is usually dominant.

Thoughts about hybridising

Hybridising orchids may appear an enticing adventure, which many growers are inclined to try. Often flowers are pollinated in order to see what might eventuate without a lot of forethought, and with a tendency to overlook the several years which may pass before the excitement of seeing seedlings in flower. After being planted out from flask, the seedlings may flower in a couple of years, but this first-flowering can often be several years away, and in all this time the plants require the correct nurture, growing conditions and a lot of patience. This long wait for results emphasises the hybridiser's need for knowledge, usually gained by experience and research, and often by observation or listening to old hands. Developing a deep understanding increases the chances of success through having a better

D. Lustrous 'Royal Flare'

D. Stunning 'Red Lip'

D. Coolart Gold 'Golden Wattle'

D. (Hilda Poxon x Yondi Tina) 'Super Gold'

D. Coolart Gold 'Butterball'

D. (Stunning x Ray's Spot) 'Ron'

D. Samford Shiraz 'Superb'

D. Melbourne 'Amber'

insight into the possible results of pollination.

Hybridisers may come and go, their achievements but stepping-stones in the continuing hope of breeding the perfect flower, and so for the benefit of native orchid growing it is helpful that they pass on their knowledge to the those who follow in their footsteps. I hope that sharing some of my own adventures will help others to enjoy the journey.

Acknowledgements

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David Butler is a noted hybridiser of Sarcochilus *and* Dendrobium *in New South Wales.*

D. Crooky 'JH'

D. Samford's Big Tina

D. Tina's Sunshine

Dendrobium speciosum-style Hybrids at Kempsey Speciosum Spectacular 2019

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Summary

Increasing numbers of *Dendrobium speciosum*-style hybrids with high background contributions of *D. speciosum* are now advancing to maturity. There are several very attractive plant and flower styles with excellent presentation. Very robust peduncles inherited from *D. speciosum* enable the racemes to support up to 20 or more large flowers of very good substance, in colours from pale cream to gold and orange.

Introduction

The wave of *D. speciosum*-style hybrids continued to roll on at the Kempsey Speciosum Spectacular in August 2019, where they dominated the *Dendrobium* hybrid classes. There was also a good selection of hot/cold hybrids. Some, such as *D.* Greta Snow, *D.* Class and *D.* Sarah Jane, were at specimen size. Hybrids based on other *Dendrocoryne* species, including *D. tetragonum,* were very infrequent.

The cream, yellow and gold *D. speciosum* hybrids have slowly advanced in size from first flowering seedlings a few years ago to plants approaching maturity and optimal display size. There was also a significant group of first flowering seedlings, mostly from Wayne Perrin, showing promise of great things to come. With relatively few active hybridists, and the early successes of brightly coloured *D. speciosum* hybrids, the continuing trend is understandable. They are likely to have good flower longevity in the warmer north coast New South Wales environment compared with *D. tetragonum* and *D. kingianum* based hybrids, which are more suited to the cooler conditions in more southerly regions.

Observations

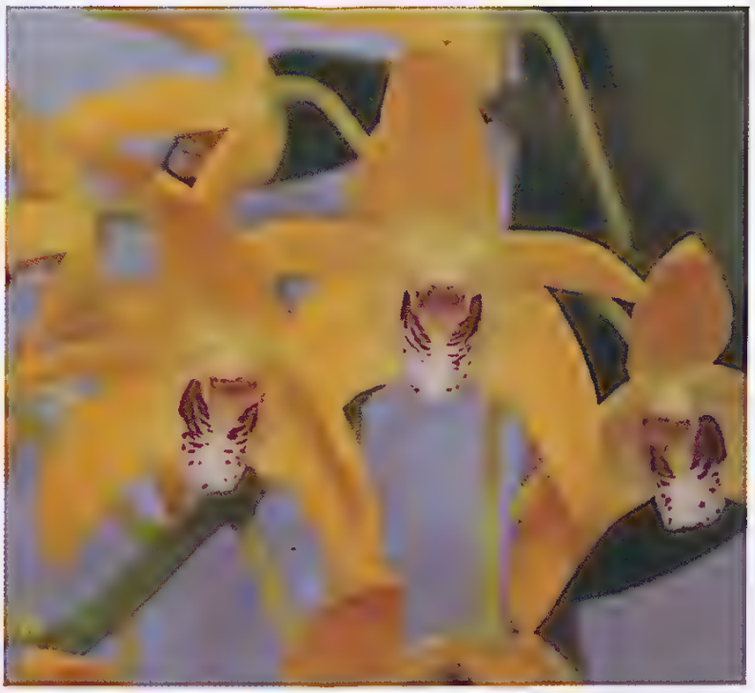
Different plant, raceme and flower styles are now apparent in a range of crosses with *D. speciosum* content from 40–87.5% (Table 1). When maturity is reached, some stunning results are likely. The frequency of different styles in various crosses may already be known by some breeders, and contributions to *The Orchadian* would be most welcome. It is not possible to gauge the frequency from the relatively small number of exhibits at shows, but the following details set out some main styles that will challenge judges. What approach should be taken in assessing them, and are all equally significant and worthy of quality awards?

The following plant styles were seen at Kempsey. The commonest plant form was a medium to tall, urn-shaped plant to 25cm in height (Table 2). The next most common form is a wider urn-shaped plant, and these may need some training to direct the stems upright so that racemes are not at excessively wide angles, and the flowers are borne above the stems. Raceme habit of both plant forms varies from fully erect, through gentler and moderately arched, to pendulous. The emergence of erect racemes with very well presented flowers is a forward step in developing superior exhibition display. Flower colours range from pale cream to a very deep orange and gold, and the flower size range is from medium to large for a *D. speciosum*-based hybrid (approx 5cm wide x 6 cm high). *Dendrobium* Dingadee and the next generation of *D.* Brimbank Gold and *D.* Cosmic Gold are well represented in these emerging styles.

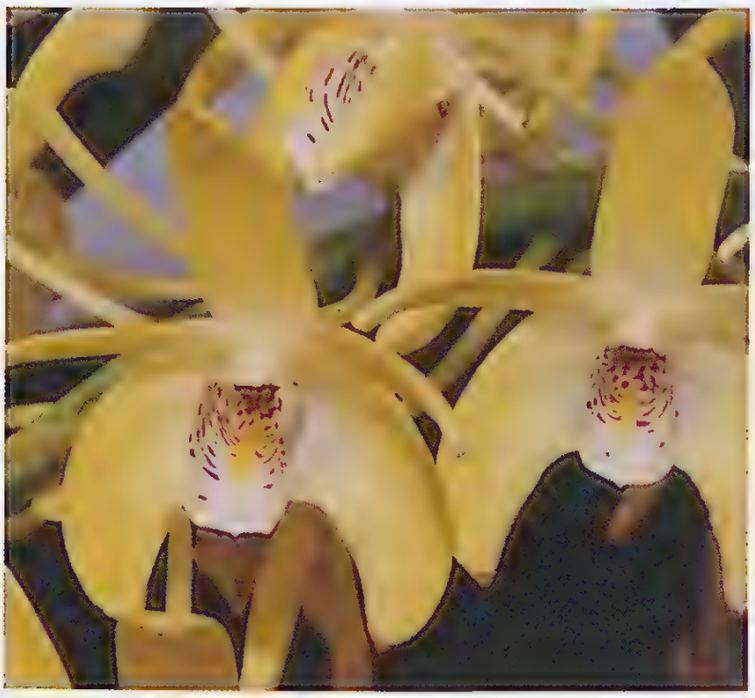
The *D. speciosum* content is variable but usually high, from 40% upwards, and the influence is clearly visible in all the crosses surveyed. A key to the high quality presentation, especially erect and semi-erect racemes, is the width of the base of the peduncles, up to 7 mm, which is required to support 12–24 large flowers of heavy substance. This derives from the *D. speciosum* influence but is variable in expression within the crosses.

At the 9th ANOS Inc. Conference and Show in Brisbane there was general consensus in the

Dendrobium Brimbank Gold



Dendrobium Brimbank Gold



Dendrobium Finale 'Sundowner'

Dendrobium Bandon Grove

Dendrobium Duno Marilyn

Dendrobium Cosmic Gold 'Plenty Pepper'

Table 1. Percentage background species composition in *Dendrobium speciosum*-style hybrids at Kempsey Speciosum Spectacular 2019

Dendrobium hybrid	*D. speciosum*	*D. fleckeri*	*D. gracilicaule*	*D. jonesii*	*D. falcorostrum*	*D. tetragonum*	*D. bigibbum*	*D. kingianum*
Brimbank Gold	78.1	10.9	-	3.1	4.7	3.1	-	-
Bandon Grove	62.5	21.9	3.1	3.1	9.4	-	-	-
Cosmic Gold	87.5	3.1	-	-	3.1	6.3	-	-
Dingadee	71.9	21.9	-	3.1	3.1	-	-	-
Dingadee Gold	79.7	12.5	-	1.6	3.1	3.1	-	-
Dungog Brook	71.9	9.4	-	3.1	3.1	3.1	3.1	6.3
Duno Marilyn	68.8	12.5	-	3.1	3.1	6.3	3.1	3.1
Finale	40.6	37.5	3.2	-	18.8	-	-	-
Nooroo	42.2	9.4	-	3.1	3.1	14.1	3.1	25

Sunday morning judging session that a range of plant and flower styles should be appreciated and rewarded. This goes well beyond the established recognition of major styles based on *D. speciosum*, *D. tetragonum* and *D. kingianum* dominated grexes. Within each there are worthy examples of different plant, raceme and flower styles that may all have award potential. There is no implication that standards are to be relaxed in recognising different styles, however the assumption that a single style exists or should be rewarded is not supported. Benchmarks will be developed and the approach to pointing up for awards will not change.

The shape of flowers varies in *D. speciosum*-style hybrids. This is related to the shape of both the parents and the variety of *D. speciosum* in the parentage. Smaller flowers may be tending to round, and the larger ones are more oval, with height much greater than width. The width of tepals varies, and overall quality is not necessarily closely correlated with wider segment width.

The most significant feature is flower presentation on and around the raceme. When exceptional, they display to the viewer with little overlap of the flowers to allow an appreciation of flower size, shape and colour to the maximum. From a judging perspective, most of the plant and flower styles appear to have examples that may be considered for awards, except for a small number that are less compact and have widely angled racemes.

Commonly Seen Hybrids

High *Dendrobium speciosum* influence (>70%)

I define the ranges of *D. speciosum* content somewhat arbitrarily, starting with >70% *D. speciosum* as 'high influence'. It must be noted that the theoretical percentage species composition of a hybrid is not necessarily correlated with observed characteristics, as the expression of the genetics varies considerably in different crosses, and depends on other species present, and combinations of species. In general it is only a rough guide for expectations.

In the range 70–87.5% background *D. speciosum* there were several hybrids, including *D.* Cosmic Gold, *D.* Dingadee Gold, *D.* Brimbank Gold, *D.* Dungog Brook, and *D.* Dingadee. These have a species background of *D. fleckeri* (3.1–21.9%), and smaller amounts of *D. falcorostrum* (3.1–9.4%), *D. jonesii* (1.6–3.1%) and *D. tetragonum* (0–6.3%).

The peduncle width at the base is wide, 5–7 mm, and supported upright and gently arching racemes with cream to deep gold flowers. Flower counts are high in the small sample - 12–24 flowers per raceme. Flower size and presentation are generally excellent, and may improve further as most of the plants exhibited had not reached full maturity.

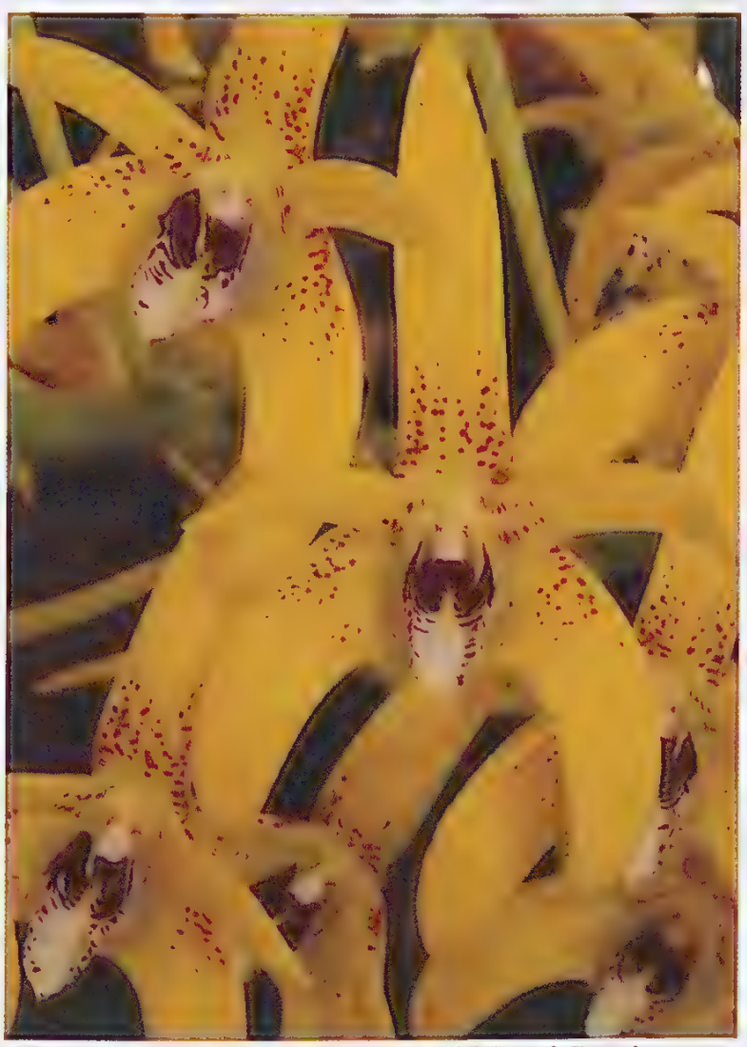
Moderate *Dendrobium speciosum* influence (40–69%)

Hybrids in this group were *D.* Marilyn, *D.* Bandon Grove, *D.* Nooroo and *D.* Finale. These also have relative high background *D. fleckeri* (9.4–37.5%) and usually small amounts of other section *Dendrocoryne* species. *Dendrobium* Finale has 18.8% background *D. falcorostrum*, and *D.* Nooroo has a background

Dendrobium Nooroo

Dendrobium Dingadee 'Alex'

Dendrobium Dingadee 'Matt'



Dendrobium Cosmic Gold 'Red Spot'

Table 2. Characteristics of some *Dendrobium speciosum*-style hybrids at the Kempsey Speciosum Spectacular

Dendrobium hybrid	Plant style	Stem Height (mm)	Raceme style	Total Raceme length (mm)	No. flowers per raceme	Flower colour	Peduncle width (mm)
Brimbank Gold	Wide, robust urn	150	Upright, arching	270	24	Gold	5
Brimbank Gold	Wide, robust urn	210	Upright, arching	210	23	Yellow-cream	6
Brimbank Gold	Wide, robust urn	160	Moderately arching	200	12	Yellow	5.5
Australian Goldrush x Dunokayla	Wide, urn	150	Straight with arching at top	240	24	Yellow	5.5
Bandon Grove (estimated)	Upright urn	230	Arching to pendulous	300	>24	Deep cream	5
Cosmic Gold	Tall, upright urn	230	Arching	200	20	Deep gold	6
Dingadee 'Alex'	Upright tall urn	270	Upright	200	20	Cream	7
Dingadee 'Matt'	Upright tall urn	300	Slightly arching	240	14	Deep cream	6
Dingadee Gold	Upright urn	140	Upright, slightly arching	240	20	Deep gold	7
Dungog Brook	Upright urn	160	Upright	150	12	Yellow	5
Duno Marilyn	Upright urn	250	Upright	260	18	Gold	6
Finale	Upright urn	240	Arching	260	24	Yellow	5.5
Nooroo	Upright urn	240	Upright	200	19	Pale yellow	3

Dendrobium Dungog Brook

Dendrobium Brimbank Gold

of 25% *D. kingianum* and 14.2% *D. tetragonum*. *Dendrobium* Nooroo is interesting, with an upright raceme despite a narrow peduncle base of 3–4 mm, and there was little sign of the influence of *D. kingianum* and *D. tetragonum* in the pale yellow *D. speciosum*-style flowers. In *D. kingianum* style hybrids, a *D. tetragonum* composition of more than 6 % usually produces violet colouration in the flowers (Adams 2018), but colour genetics is complex and not easily predictable. Flower counts were high, 18–24 per raceme, with deep cream to gold colours, similar to those seen in the high *D. speciosum* content group. Flowers tended more towards a round shape and sometimes with more arching peduncles.

Discussion

In *D. speciosum*-style hybrids, the objectives of robust plants with cream-gold flowers of high quality, good presentation, heavy substance and high flower counts have been largely achieved. The time to produce plants that are approaching a size that produces optimal displays has been considerable, and longer than for most other hybrids, even with expert growers in the most favourable regions. This is to be expected with *D. speciosum* parentage. Most *Dendrobium* hybrids take at least 10 years to reach peak maturity, or longer in less favourable growing areas like cooler parts of southern Victoria. I have found that cool growing *D. kingianum* hybrids can take a similar time, and are slower still if there is a significant component of *D. speciosum* in the breeding line. The best plants emerging from the *D. speciosum*-style breeding are therefore of high value in a collection, and are likely to be kept well into the future after the years of effort to develop them.

There seems to be little difference in the quality of the characteristics of hybrids with very high *D. speciosum* content (>70 %) and the moderately high group (40–69%), which might come as a surprise. The sample reported here is small, and the breeders who have flowered many examples from different crosses may come to other conclusions. There seems to be a marked similarity in appearance of the best outcomes for different styles of plants and flowers as seen in the 2019 Kempsey sample. They all have cream to gold flowers with a lot of similarities, very good presentation, and most, but not all, have wide and well marked labellums. It is difficult to say where further improvements can be made, and these plants may be optimum for the style, especially where the peduncle is wide and strong and can support 20 or more flowers.

There may be a temptation to keep breeding back to *D. speciosum*, which would produce *D. speciosum* background of about 70–93% in the next generation. From this sample, 70% composition or more does not appear to make a significant improvement, and higher *D. speciosum* composition may prolong the time to optimal size. It would be worth considering taking different directions in future breeding, or using very short stemmed *D. speciosum* to limit plant size.

Dendrobium Australian Goldrush x Dunokayla

Dendrobium Dingadee 'Gold'

Peaches and Cream – a *Dendrobium fleckeri* hybrid at the Kempsey Speciosum Spectacular

Text and Photos Roslyn Capell
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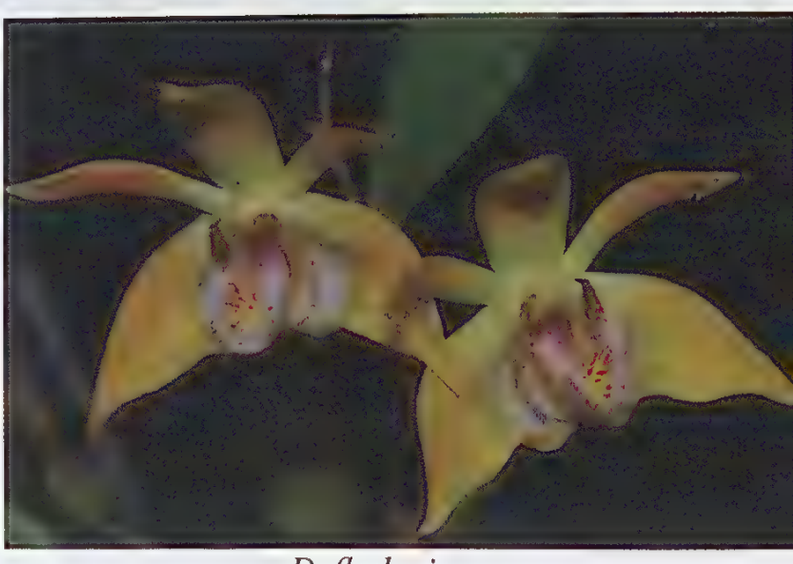
This year's Kempsey Speciosum Spectacular was a very enjoyable event, and a highlight of the native orchid year, as always. There were many fine plants benched, both species and hybrids, but for now I want to talk about one soft-peach coloured hybrid that caught my eye. It is an example of what I call the Kayla style of hybrid, in which *Dendrobium fleckeri* has a significant percentage presence. *Dendrobium* Kayla itself contains 37.5% *D. fleckeri* and its progeny *D.* Dunokayla and *D.* Dingadee contain 18.8% and 21.9% *D. fleckeri* respectively. The only other species in the background of these hybrids are *D. speciosum*, *D. falcorostrum* and *D. jonesii*. With only those species in their makeup, there is a limited range of colours possible and most of them are cream or pale yellow.

D. (Lynette Banks x Yondi Tina) x *D.* Dunokayla

Occasionally a deeper yellow one will crop up, or one with an appealing and distinctive peach hue which is commonly seen in *D. fleckeri* hybrids, for example *D.* Colonial Bullion. Even some of the flowers that are essentially cream have a pale peach tinge to them, like *D.* Dunokayla 'Sundowner' which was also benched at Kempsey. Infusions of other species are often introduced when breeders venture in a new direction. For example, *D.* Bandon Grove contains 3.1% *D. gracilicaule*, and *D.* Dingadee Gold and *D.* Brimbank Gold each contain 3.1% *D. tetragonum*. However, these hybrids still contain significantly larger proportions of *D. fleckeri* (21.9% in the case of *D.* Bandon Grove, 12.5% for *D.* Dingadee Gold and 10.9% for *D.* Brimbank Gold).

D. Dunokayla 'Sundowner'

The peach coloured flower that caught my attention at Kempsey this year was (*D.* Lynette Banks x *D.* Yondi Tina) x *D.* Dunokayla. It is 53.15% *D. speciosum*, 18.8% *D. fleckeri*, 10.95% *D. jonesii*, 9.4% *D. falcorostrum*, 6.4% *D. tetragonum* and 1.5% *D. kingianum*. Despite the presence of these last two species, I believe *D. fleckeri* is the main source of the attractive colour.



D. fleckeri

Roslyn Capell is Secretary ANOS Inc., an ANOS and AOC judge.

Earlier Descriptions of *Dendrobium* taxa by F.M. Bailey

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While researching Australian native orchids, I came across three earlier descriptions of taxa by Frederick Manson Bailey in the Brisbane Courier Mail in September 1883.

Dendrobium kingianum var. *pallidum, D. speciosum* var. *nitidum* and *D. speciosum* var. *delicatum* are listed as being described by Bailey in the *Proceedings of the Royal Society of Queensland* Vol.1, 1885. In a postscript to that paper Bailey made an unusual statement, "The three plants marked with an asterisk (*) were published in a newspaper report of the last meeting of the Queensland Philosophical Society, a publication scarcely meeting the requirements of scientific currency".

The electronic Plant Information Centre (ePIC, accessed 2018) also lists the descriptions as being in *Proceedings of the Royal Society of Queensland*, Vol.1, 1885. There were notes under *D. kingianum* var. *pallidum* and *D. speciosum* var. *delicatum* – "For note on possible earlier publication see entry for *D. speciosum* var. *nitidum"*. Under *D. speciosum* var. *nitidum* they indicated there may be a possible earlier publication.

Dockrill 1969) listed the descriptions as being in *Proceedings of the Royal Society of Queensland*, Vol.1, 1884. He notes under *D. kingianum* var. *pallidum* there no mention of an earlier publication. Under *D. speciosum* var. *nitidum* he states that this is a possible variety of *D. speciosum* or it may be an extreme variation of the typical *D. speciosum* from the tropics. Under *D. speciosum* var. *delicatum,* he stated 'Also published as a *nom.nud.* in the Brisbane Courier Mail 38. No 8141 (13/11/1884) 5)'

I searched The Brisbane Courier Mail and the reference was incorrect - 13th Nov 1884 was not Vol 38. it was Vol. 39 No 8376, and there was no report regarding Bailey on Page 5 or anywhere in that day's news. I then set about trying to establish when the Queensland Philosophical Society held their final meeting, said to be held on 23rd August 1883. A search located the report on this meeting in *The Brisbane Courier* Vol. 38 (8000) p7 1st Sept 1883 and it contained an entry headed 'Mr. Bailey's Paper' (Figure 1).

Thus the reference to the original descriptions of these three orchids being published in the *Proceedings of the Royal Society of Queensland*, Vol. 1, 1884, is therefore incorrect and this record should be the publication in *The Brisbane Courie*r Vol. 38 (8000) p7 1st Sept 1883. Kew records listed the publication of the *Proceedings of the Royal Society of Queensland* Vol 1 as having occurred in 1885 – in fact Vol.1 (1), in which Bailey's paper was published, was printed in 1884.

Dendrobium speciosum var. *nitidum*

The provenance of the type specimens is uncertain (Bailey 1884) and has been reviewed by Clemesha (1981) who gives the type location as 'Tropical Queensland', the date, location and collector not recorded. It was grown in Bowen Park in Brisbane and has has been considered by some to be a northern form of *Dendrobium* × *gracillimum*. According to Ted Gregory (pers. comm), the plant of "nitidum", after quite some years of being grown in Bowen Park, was at some stage acquired by a wealthy New South Wales landowner, after the exchange of a large sum of money. The plant was described by those who saw it as being "of the most magnificent white in colour". The new owner's intention for the acquisition of the plant was not apparent, but the ownership of such a fine plant would have put him in high standing within the community. Sadly the move to a location further south than Bowen Park sealed its fate when the winter of the following year produced a frost, so severe that he lost most of his plants including the "*nitidum*".

The circumstances that lead to the landowners acquisition of the "*nitidum*" have been long lost, however Bowen Park was once approx. 16 ha and now is only 1.774ha. Portions were divided and sold off as development continued, and the landowner may have acquired it from a parcel of land divided off at some early stage.

Dendrobium speciosum var. *nitidum* 'Hilda Curtis'

Dendrobium speciosum var. *nitidum*

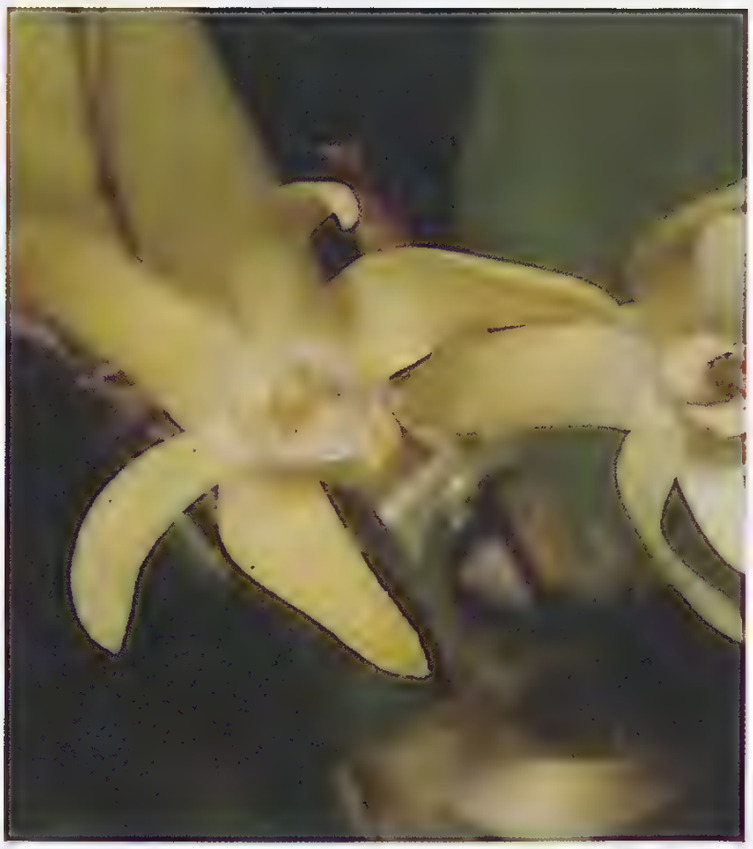
Dendrobium × *delicatum* 'Bailey's'

Dendrobium × *delicatum* 'Bailey's'

Dendrobium × *delicatum* 'Bailey's'

Dendrobium × *delicatum* 'Bailey's' and *D.* × *gracillimum*

Dendrobium "nitidum" from Mt.Tamborine



Dendrobium x *gracillimum*

MR. BAILEY'S PAPER.

Mr. F. M. Bailey gave the following notes on some new varieties of Dendrobiums :—

"I have availed myself of the opportunity afforded by the society's present meeting to bring under the notice of members a few new varieties of Dendrobiums. Of the three varieties two are forms of *D. speciosum*, Sm., and one of *D. Kingianum*, Bidw. I have been afforded the advantage of determining these varieties by the interest taken of late in the cultivation of epiphytal orchids, both at the Botanic Gardens and Bowen Park. It is to be hoped that this work will be continued; and thus botanists will be enabled, by the comparison of living specimens, to correct diagnostic descriptions:—

"*Dendrobium Kingianum*, Bidw., var. *pallidum*.—Stems clustered, often forming a dense matted mass of 1ft. or 2ft. diameter. Stem, 2in. to 4in. high; slender, except the base, which is enlarged into pseudo-bulbs, the stems often bearing the torn bases of old leaves. Leaves, two or three, thin, 2in. to 3in. long, and about ¼in. broad. Racemes slightly exceeding, the leaves slender, and bearing few—three or four—white or lilac stained flowers, rather smaller than in the normal form. This variety differs from the normal form in growing in more dense masses, and in the smaller and light-coloured or white flowers. Habitat, Main Range. Collected by B. Crow, and C. H. Hartmann.

"*Dendrobium speciosum*, Sm. var. *nitidum*.—Stems numerous, 1½ft. to 2ft. high, and of a nearly even diameter of about half-an-inch, usually smooth, shining, fluted, not clothed with the torn bases of old leaves; leaves, 3 to 5, lanceolate, 6in. to 7in. long, 1½in. to 2in. broad, coriaceous, the upper surface usually shining. Racemes 6in. to 8in. long, bearing 25 to 30 flowers, yellowish green at first, afterwards pure white, pedicels over 1in. long, spur short, outer segments 6 to 7 lines long, and about 2 lines broad, the two inner segments about equal to the outer in length, but narrower. Labellum short, the lateral lobes marked with transverse purplish lines, the middle lobe apiculate, the longitudinal plates yellow. In habit this form resembles var. *Hillii*, but differs in its glossy and more slender stem and leaves, and in its short dense racemes. Habitat, Cairns. Collector unknown. Now blooming at Bowen Park, where it also bloomed in 1877.

"*Dendrobium speciosum*, Sm., var. *delicatum*.—Stems forming dense masses, 6in. to 9in. high, swelling at the base into pseudo-bulbs as in *D. Kingianum*, fluted, and more or less clothed with the torn bases of the old leaves. Leaves 3 or 4, from 3½in. to 4½in. long, and ¾in. to 1¼in. broad, the apex obtuse or emarginate, in texture resembling those of the var. *fusiforme*. Racemes, 1 or 2, from 7in. to 8in. long, bearing 8 or 9 distant white flowers, the outer segments 6 to 8 lines long, inner segments about as long, but much narrower and very thin, the spur rather long and curved. Labellum of a very delicate texture, white speckled with purple, middle lobe apiculate, the longitudinal plates of the disc yellow, column white.—Habitat, Main Range. Collected by B. Crow and C. H. Hartmann."

The meeting was then adjourned.

Figures 1a, 1b Excerpt from *The Brisbane Courier* Vol. 38 (8000) p.7. 1st Sept 1883.

Bowen Park was a large area where plants collected from many distant locations were established, and their provenance and identification were often uncertain. It was poorly resourced from a curatorial aspect and I have not been able to find any lists or information that assist with the origins of this plant.

What had happened to the original plant remained a mystery to almost everyone and many tried to rediscover it. In September 1924 Mrs. Hilda Curtis (nee Geissmann) from Tamborine Mountain collected a plant that she believed to be "*nitidum*" and took it to the Government Botanist (possibly C.T.White) for identification. It was erroneously identified as *D. speciosum* var. *nitidum*. The plant was later confirmed to be a tall slender form of *D.* × *delicatum*, typical of plants from this location, as *D. kingianum* is very tall and slender and the *D. speciosum* var. *hillii* has a similar habit. The plant is affectionately known as the Tamborine Mountain "*nitidum*", but the correct name is *D.* × *delicatum*.

Dendrobium kingianum var. *pallidum* (from the Editor)

A tall *D. kingianum* (up to nine inches in stem height) was described by F.M.Bailey in *Proceedings of the Royal Society of Queensland* Vol.1: 11, 1884, and in his *Queensland Flora* (Bailey 1902). It was collected on Main Range, South Queensland by B. Crow and C.H. Hartmann. The holotype was lodged in the Queensland Herbarium and an isotype lodged at Kew in England. There is a pale-flowered plant handed down by specialist collectors, and it is a close match to Bailey's description. These plants are now understood as colour forms of *D. kingianum* subsp. *kingianum* and can be found in various locations in the northern part of the distribution range (Adams and Lawson 1995).

Note on Early Scientific Societies of Queensland

The inaugural meeting of the Queensland Philosophical Society was held on 1st March 1859 by Dr Fredrick Barton, Charles Coxen, and Reverend George Wight. The aim of the Society was 'the discussion of scientific subjects, with special reference to the colony of Queensland' As Queensland was not proclaimed a colony until 6th June 1859, it is unlikely that the society assumed the name before that date. The society was also instrumental in establishing the museum in 1879. The Queensland Philosophical Society started to consider a new name and direction as early as March 1879 and discussions continued over the next few years. While the meeting on the 23rd August 1883 has been reported as the final meeting of the Philosophical Society, a search of their records shows that later meetings took place before the actual amalgamation. A meeting to establish the Royal Society of Queensland was held on 20th Sept 1883 and at a later meeting on 26th November 1883, the terms for incorporation of the Philosophical Society into the new society were adopted. The inaugural meeting of the Queensland Royal Society was held on 8th January 1884.

References

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It was noted during 2019 when I revisited the information, that the entry had been removed. (ePIC is a major resource discovery project to provide a single point of search across all Kew's major specimen, bibliographic and taxonomic databases on the internet).

Grahame Muller, Orchidaceous Supplies and Books, has a long term interest in historical orchid articles.

Seasonal Australian Terrestrial Orchids

Text and Photos (except where noted) Helen Richards
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The purpose of this presentation at the ANOS Conference and Show 2019 was to bring together people who are cultivating Australian terrestrial orchids to pool their ideas, speak of their successes and problems, and assist people who would like to cultivate Australian terrestrial orchids. Neil Anderton and I were invited to lead this session, and we have each been applying our skills to different areas. I am a backyard grower who can relate to the problems of 'normal' people, whereas Neil has applied his professional skills to laboratory propagation and re-introductions.

The cultural basics as I see it are:

1. What mix to use?
2. What container to use?
3. What light requirements are best?
4. What are the watering requirements?
5. What housing/protection to provide?
6. What else will promote flowering?
7. How best to propagate them?
8. What pests/diseases will be encountered?

Potting mix

This is a perennial problem. The mix must provide support, nutrients, oxygen and water in the right proportions. The soils in which they have evolved are generally low nutrient, well drained and the majority are slightly acidic. We want a low nutrient, middle of the road pH and well drained mix. My mix, well trialled and developed by ANOS growers, comprises leaf mould one part, buzzer chips one part, friable loam one part and coarse sand two parts. Leaf mould provides nutrients, buzzer chips also, but are more slowly released. Loam provides nutrients and helps retain moisture, and coarse sand makes it drain freely. The microbes use up nitrogen as they break down the leaf mound and buzzer chips, so one tablespoonful of blood and bone is added to a nine litre bucket of mix to initially replace nitrogen. The buzzer chips can be hardwood or softwood or mixture of both, but not western red cedar (toxic resins), chipboard (glue) or treated pine (arsenic). The pH can be adjusted for alkaline-loving species by the addition of a small amount of lime. The individual ingredients can be varied according to what is being grown, for example, more leaf mould for *Corybas* alliance, more coarse sand for a more free-draining mix e.g. for Rufa group *Pterostylis*.

There are many other mixes used. Not all the above ingredients are as easy to obtain as they were 40 years ago. I have tried *Debco* Low nutrient native mix three parts and coarse sand one part. Victorian growers have bought *BioGro* in bulk and added various items such as leaf mould for moisture retention, or perlite for drainage.

Containers

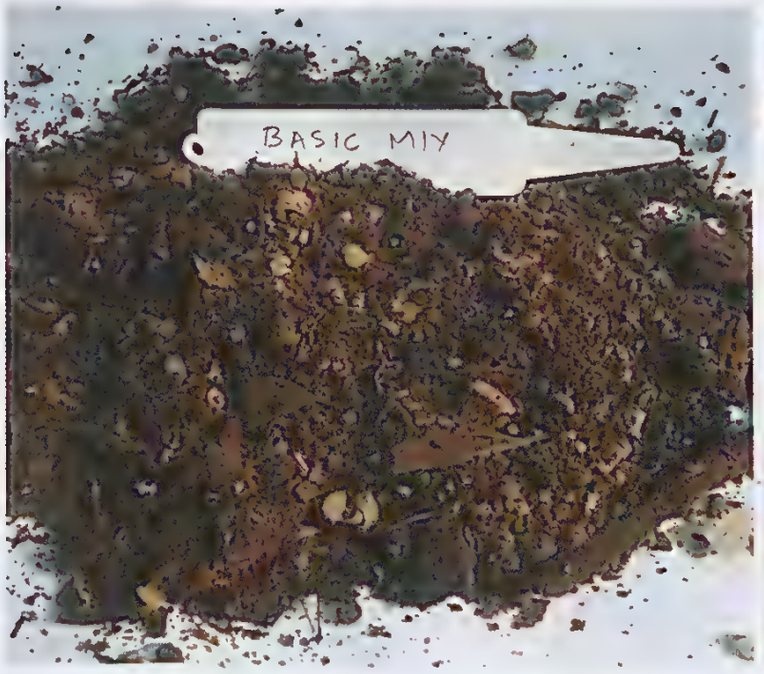
I use 150mm black plastic pots. They do not dry out as quickly as smaller pots. Terra-cotta pots are porous and dry out more quickly. Having the same sized pot but varying the water retaining capacity of the mix means that I can water all of my terrestrials more or less at the same time. Drainage holes must be checked and cleared it necessary. I use shadecloth in the bottom of my pots to stop the dry mix from running out the base in summer.

Light requirements

This is a very important consideration. Plants soon respond to incorrect light. Reference books will indicate a plant's light requirements. *Corybas* alliance grow in shadier, more moist, protected environments, while *Thelymitra* grow in sunny positions. I have *Corybas* Alliance group in the shadiest part of my shadehouse, *Pterostylis*, *Acianthus*, and *Chiloglottis* in the middle and *Diuris*, *Caladenia* and *Thelymitra* in the sunniest spot. *Diuris* need adequate sunlight to flower well. In my situation, I have to add a layer of shadecloth to the shadehouse roof from October to April.

Watering

Most of the terrestrials to which we are referring are deciduous, having a life cycle according to the seasons. Tubers are dormant over summer, growing in autumn, winter and



Free draining, friable mix for terrestrials that retains enough moisture for growth.

Arrange plants according to their light requirements, *Corybas* alliance in the shadier position, *Thelymitra* and *Diuris* in the sunniest spot.

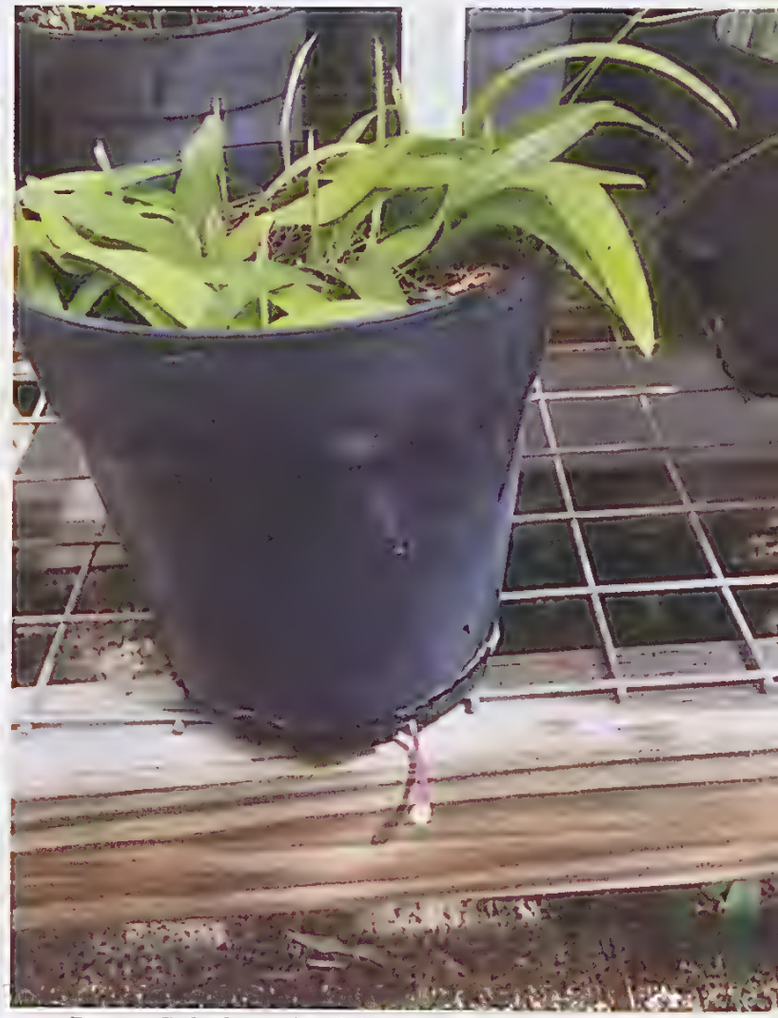
Plants in full dormancy only require the occasional sprinkle of water to prevent tuber dessication until the next growing period starts.

For some species, dormant tubers are stored with banana skins for three weeks to promote flowering.

Leptoceras menzesii flowering after treatment with banana skins, compared with control.

Corybas still growing in late October, so keep them well watered then.

Pterostylis Rufa group require minimal or no water when still flowering, as plants have dried off.



Repot *Caladenia latifolia* regularly as it is a colony former, especially if a tuber grows out of the pot.

Developing seed capsules, record carefully.

Chiloglottis trapeziformis.

spring and making replacement and daughter tubers before drying off above ground at the end of the growing season. The new tubers are underground ready to shoot at the beginning of the next growing season. They need moisture when they are growing but not when dormant. They are prone to rotting if wet when dormant. When growing, their moisture level needs to remain fairly constant. In Victoria that means most pots are kept moist from late February until early November. Summer and early autumn flowering species are kept damp while they are growing, which can be over summer.

Housing

I have a shadehouse with a solid roof, three walls of shade cloth, and one solid wall to slow down the wind and protect plants from the strong westerly sun in summer. Benches are waist high, and the house is bird-proof. I have a lot of plants, but others might have just a few pots. My top priority is to have plants off the ground away from pests and animals. Light would be the next consideration and finally watering. You can always water your plants if rain is inadequate or bring them under cover if you anticipate a storm or excessive rain, however that is only practical if you have just a few pots.

Promotion of flowering

We all want our plants to flower. The first consideration is the size of the tuber. When repotting, I place 20 of the pea-shaped tubers in a 150mm pot. The biggest tubers are planted out, and the excess smaller tubers go to the Tuber Bank. The bigger the tuber, the more likely it is to flower. With the larger *Diuris*, *Lyperanthus* and *Thelymitra* tubers my maximum per pot is likely to be 10 or less with very large tubers. They have to have some room.

Early autumn flowering species need to be kept moist from when they start shooting, which is frequently late December into January. Keeping the mix just moist enough to support the new growths without rotting them off is a challenge for me in Victoria. If they are not kept moist, they are less likely to develop into flowering plants, so you will end up with a pot full of rosettes only. Some species which flower in response to fire in the wild can be induced to flower by storing the dormant tubers with banana skins for 2–3 weeks. The method that I have used very successfully for *Leptoceras menziesii* and *Caladenia latifolia* is to place the dormant tubers and banana skins into a small vessel within an ice cream container with lid. The banana skins have to be replaced regularly, as they became mouldy quickly in the summer weather. This generally happens in January or February. Flowering rate is dramatically increased, with flowering frequently 100% of the larger tubers.

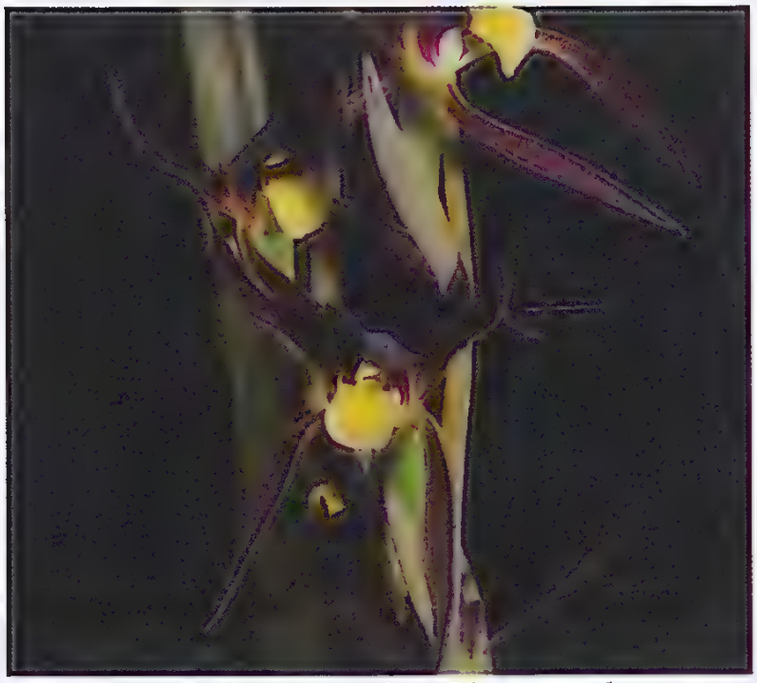
Propagation

Colony formers are great to learn with as they make more than one new tuber, so hopefully the gains make up for the losses. Solitary species propagate in the wild from seed. Some solitary species can be induced to produce a second new tuber by removing the first new tuber in spring. I have been doing this for years with solitary *Diuris* species in particular, and I have also successfully applied the method to *Eriochilus* and solitary *Pterostylis*. I would expect that it works with solitary *Thelymitra,* but definitely not *Caladenia.*

When the plant has made its new tuber, in September in my experience, then the plant can be carefully tipped out of its pot and the new tuber, well formed by this time, gently twisted off. The old tuber must still remain firmly attached to the stem. The attachment is brittle so great care must be taken not to break off the old tuber. The plant is carefully replaced in the pot and grown on for as long as possible, for a minimum of two months. During this time the plant should grow a second or more small replacement tubers. The natural method of propagation is from seed. Flowers can be cross-pollinated, and seed collected 6–8 weeks later. Some people have success by sowing seed around the parent plants the following autumn. I have had limited success with that method so I pass seed on to Richard Thomson's seed propagation group, who have great success germinating seed both symbiotically and asymbiotically. I am always happy to try my hand at deflasking and my skills are improving.

Pests and Diseases

Strong healthy plants minimize disease.



Lyperanthus suaveolens Photo P. Adams

Leptoceras menziesii Photo P. Adams

Caladenia latifolia Photo P. Adams

Pterostylis baptistii Photo P. Adams

Caladenia carnea Photo P. Adams

Caladenia ampla Photo P. Adams

Damping off in summer and autumn is the main problem, and watering is critical. My house is well ventilated. I have had some virus-infected plants over the years which have been removed and destroyed immediately. Having lost some very important *Diuris* species years ago because of not recognizing the symptoms, I don't take any chances now. That is one reason why I will not tolerate aphids in my collection, as they will spread virus if it is present. Frequently observing plants means that problems and pests are noticed immediately. Scale, which regularly occurs on *Spiranthes* and *Cryptostylis* species, the evergreens, can be wiped off if observed early in the infestation. Thrip distort flowers in autumn, as they lodge in leaf axils and do damage before they are noticed. I have not had spider mites for several years. I have mice and rats, especially in early autumn, who bite off flowering stems. My shadehouse is kept well baited.

Summary of Discussion on terrestrials at the ANOS Conference 2019

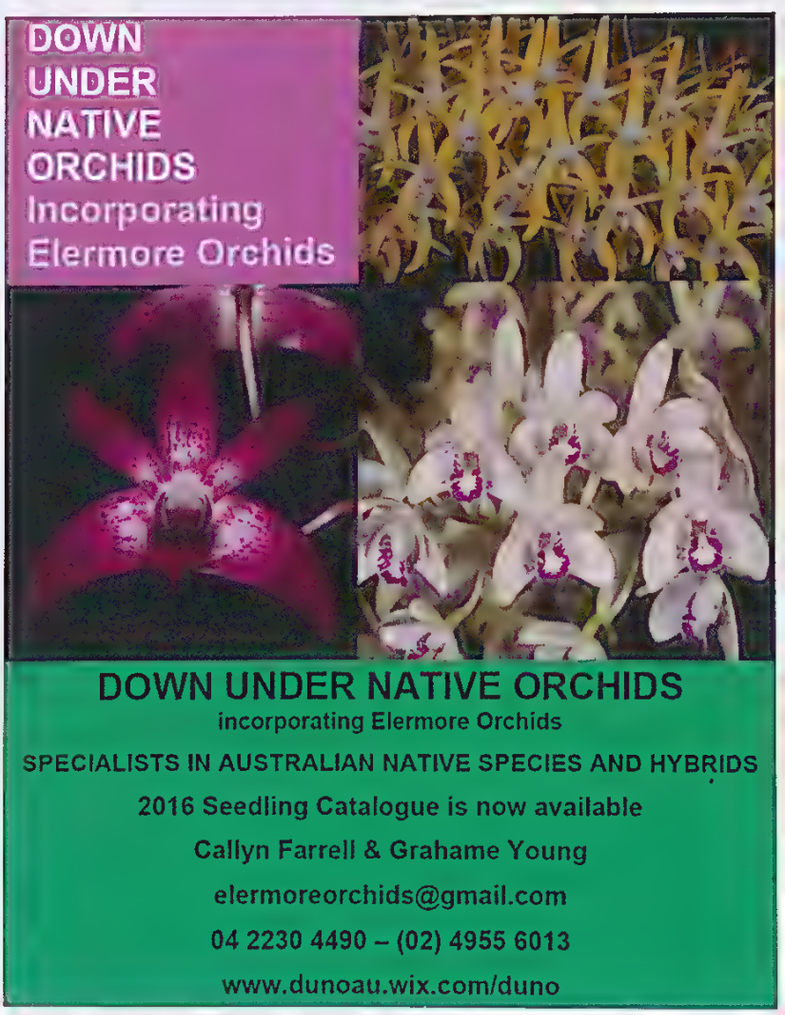
The effort required to develop plants in *in-vitro* mixed fungal and seed culture was discussed. The success rates of re-introduction into the wild is variable and may be very low if sites and post introduction weather in subsequent years are unfavourable. Grazing, pests and competition from other species are challenges, and monitoring of emergence, flowering and pollination is essential. Experiments using fertilisers in the re-introduction may increase chances of success.

The culture of seasonal terrestrials in different regions from north to south was compared. The techniques may vary according to different seasons, and the seasons used by indigenous people (at least six per year) may provide a better guide to culture than the western four seasons. Some seasons are short, as little as two weeks. In general, the times of emergence of plants from dormant structures seems similar from south-east Queensland to Victoria and Tasmania, main emergence being in autumn. Spring may be earlier south-east Queensland, about the second week in July.

Most successful culture involves covering the roof of the plant house to control the supply of water, avoiding negative effects such as rot due to high rainfall. In summer in dry periods, a light application of spray periodically will prevent tuber desiccation. There is a marked difference between coastal and upland environments, so culture will vary considerably.

Mixes require sourcing of soil and mulch material that is local to the areas of growers, and this can pose problems and require experimentation. Some examples of sources in different grower locations were discussed and this was helpful in overcoming the 'mix' problems. Decomposing leaf litter of various types was considered, with various mulches such as *Casuarina*, pine needles, and small stones, depending on availability.

Helen Richards is a leading terrestrial orchid grower in Victoria .

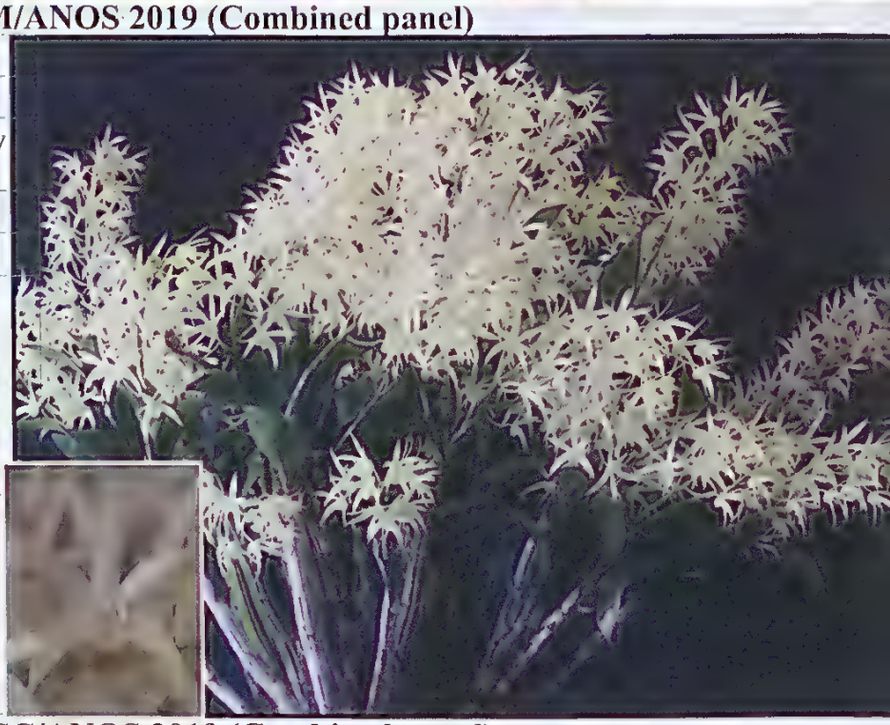


#356 *Dendrobium* Bellambi 'Genesis' HCC/ANOS 2019 (Combined panel)

Points	76.0
Owner	Down Under Native O.
Date & event	22 August 2019 ANOS Conference
Photos by	Jon Cara
#flowers/inflorescences	41 / 5
Measurements(mm):	
flower	40.1 across 41.8 vertical
petal	20.9L 5.5W
sepal	23L 14.1W
dorsal	24.8L 9.1W
labellum	12L 7.3W
inflorescence length	116
Detailed avge points:	
shape(25)	19.0
colour(20)	16.3
size(15)	11.9
substance/texture(10)	7.9
floriferousness(15)	10.4
habit/attractive(15)	10.5

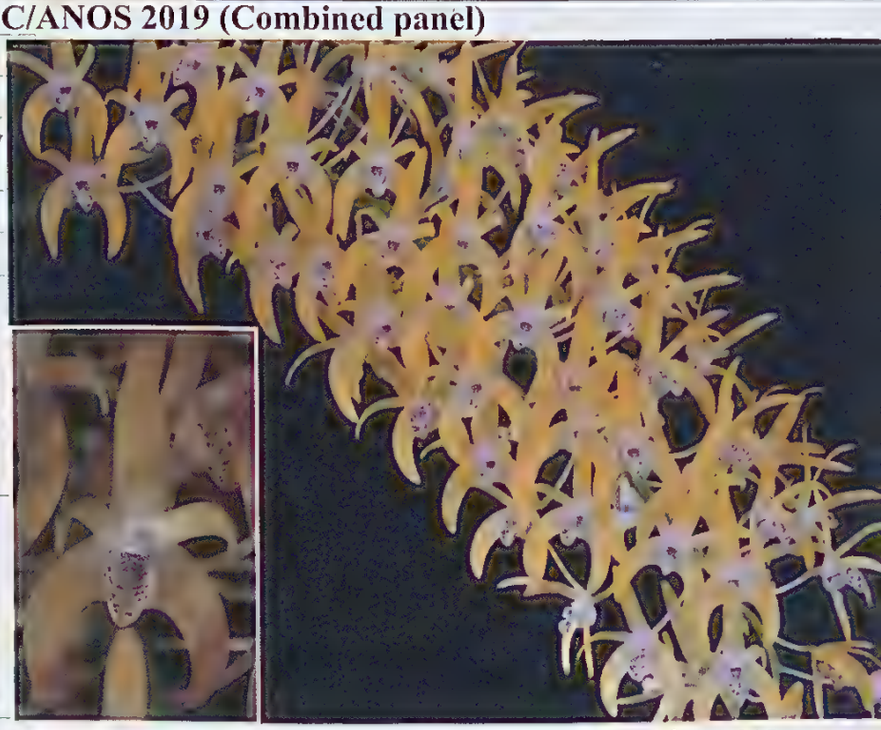
#357 *Dendrobium* Greta Snow 'Patricia' AM/ANOS 2019 (Combined panel)

Points	81.35
Owner	Henk van den Berg
Date & event	31 August2019 Kempsey Speciosum Spectacular
Photos by	Ian Chalmers
#flowers/inflorescences	870 & 7 buds / 35
Measurements(mm):	
flower	43.4.2 across 65 vertical
petal	38L 6W
sepal	37.6L 9.5W
dorsal	35L 8.4W
labellum	19.4L 9.9W
inflorescence length	420
Detailed avge points:	
shape(25)	20.4
colour(20)	16.5
size(15)	12.2
substance/texture(10)	7.9
floriferousness(15)	12.5
habit/attractive(15)	11.85



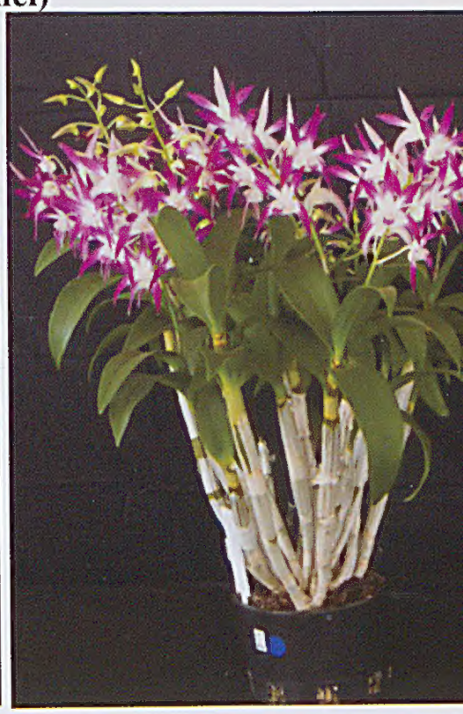
#358 *Dendrobium speciosum* 'Maximus' HCC/ANOS 2019 (Combined panel)

Points	77.55
Owner	Bernie Fletcher
Date & event	31 August2019 Kempsey Speciosum Spectacular
Photos by	Ian Chalmers
#flowers/inflorescences	230 / 3
Measurements(mm):	
flower	34 across 50.4 vertical
petal	36.5L 3.6W
sepal	30L 8.9W
dorsal	34L 8.4W
labellum	13L 5.6W
inflorescence length	48
Detailed avge points:	
shape(25)	19.3
colour(20)	16.7
size(15)	11.6
substance/texture(10)	7.65
floriferousness(15)	10.65
habit/attractive(15)	11.65



#359 *Dendrobium* Sarah Jane 'Purvis' HCC/ANOS 2019 (Combined panel)

Points	78.4
Owner	Robert Bulley
Date & event	31 August2019 Kempsey Speciosum Spectacular
Photos by	Ian Chalmers
#flowers/inflorescences	66 & 37 buds / 11
Measurements(mm):	
flower	35.2 across 43 vertical
petal	31.25L 16.7W
sepal	36.7L 7.78W
dorsal	46.8L 8.33W
labellum	20L 13.5W
inflorescence length	250
Detailed avge points:	
shape(25)	20.15
colour(20)	15.5
size(15)	12.6
substance/texture(10)	7.75
floriferousness(15)	10.9
habit/attractive(15)	11.5



#361 *Dendrobium* Dingadee 'Kaz' HCC/ANOS 2019 (NSW)

Points	78.90
Owner	Wayne Perrin
Date & event	7 September 2019 ANOS Newcasle Show
Photos by	Phil Radford
#flowers/inflorescences	51 / 3
Measurements(mm):	
flower	52 across 65 vertical
petal	25L 7W
sepal	30L 13W
dorsal	37L 10W
labellum	13L 11W
inflorescence length	230
Detailed avge points:	
shape(25)	20.2
colour(20)	15.8
size(15)	12.2
substance/texture(10)	7.5
floriferousness(15)	11.2
habit/attractive(15)	12

#362 *Dendrobium speciosum var. speciosum* '-' HCC/ANOS 2019 (NSW)

Points	77.30
Owner	Fred Fear
Date & event	7 September 2019 ANOS Newcasle Show
Photos by	Phil Radford
#flowers/inflorescences	166 / 15
Measurements(mm):	
flower	41 across 70 vertical
petal	35L 5W
sepal	33L 11W
dorsal	35L 10W
labellum	11L 6W
inflorescence length	700
Detailed avge points:	
shape(25)	10.5
colour(20)	16.35
size(15)	11.8
substance/texture(10)	7.35
floriferousness(15)	10.2
habit/attractive(15)	12.1

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- **ANOS Central Coast**; PO Box 3010, Erina NSW 2250 - Neville Lee (02)4340 5157 2nd Wednesday each month, 8pm. Narara Community Centre, 2 Pandala Rd, Narara 2250
- **ANOS Far North Coast Inc.**: 2 Treelands Cres, Ballina, NSW 2478 - Keith Skaines (02)6686 6303 3rd Saturday of month (except Dec. & Jan.), 2pm various venues, contact the secretary.
- **ANOS Illawarra**: 2 Wilford St, Corrimal NSW 2518 - Bruce Porter (02)4284 8308 2nd Tuesday each month, 7pm. Old Court House, Wollongong.
- **ANOS Macarthur and District**: 7 Pickett Ave, Minto NSW 2566 NSW - Wally Southwell (02) 4681 8589 3rd Tuesday each month, 8pm. Birriwa Community Hall, Fitzpatrick Rd, Mt Annan.
- **ANOS Mid-North Coast**: 69 The Lakes Way, Forster NSW 2428 - John Zietsch (02)6554 9733 3rd Sunday each month, 12 noon, followed by BBQ. Contact for location - Taree or Wauchope
- **ANOS Newcastle Inc.**: PO Box 5079 Raymond Terrace NSW 2324 - Peter Denning (02)4975 3729 4th Thursday of month, 7.30pm. Elermore Vale Community Centre, Croudace St, Elermore Vale.
- **ANOS Sydney Inc.**: 9 Alicia St, Glenwood NSW 2768 - Andrew Locke (02)8824 6338 3rd Friday each month, 8pm. Senior Citizens Hall, B.H. Community Centre, Conie Ave, Baulkham Hills.
- **ANOS Warringah Inc.**: PO Box 421, Forestville NSW 2087 - Bill Dobson (02)9981 2525 3rd Tuesday each month, 8pm. Community Hall, Starkey St, Forestville.

QUEENSLAND

- **ANOS Beenleigh Inc.**: PO Box 1130, Beenleigh QLD 4207 - David Cleal (07)3805 6865 1st Thursday each month, 7.30pm. Showground Hall, James St, Beenleigh
- **ANOS Kabi Inc.**: PO Box 424, Aspley QLD 4034 - David James (07) 3359 5752 2nd Tuesday of month except Jan., 7.30pm. Isabella Griffin Room, Strathpine Community Centre, 199 Gympie Road, Strathpine.
- **ANOS Mackay and District**: 24 Barton St, Mackay, QLD - Arthur Pinkney (07)4952 2186 2nd Thursday each month, Andergrove Community Centre, Celeber Drive, Andergrove.
- **ANOS Townsville Inc.**: 92 Curie St, Wulguru QLD 4811 - John Nuss (07)4778 4311 1st Tuesday monthly (excl. Jan.) 8pm Townsville O.S. Hall, Joe Kirwan Pk, cnr Bamford Lane & Charles St, Townsville
- **Native Orchid Society of Toowoomba Inc.** 106 Umbiram Rd, Wyreema QLD 4352 - Josie Wright (07)4696 2150 1st Friday of month, 7.30pm Lutheran Church Hall, cnr West and Alderley St, Toowoomba

SOUTH AUSTRALIA

- **Native Orchid Society of South Australia Inc.**: PO Box 565 Unley SA 5061 - Les Nesbitt (08) 8261 1550 4th Tuesday each month, 8pm. St Matthew's Hall, 67 Bridge St, Kensington.

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- **ANOS Geelong Inc.**: 609 South Street, Ballarat VIC 3350 - Anita Hinton (03) 9743 6040 2nd Wednesday each month, 7.30pm. Uniting Church Hall, Yarra St, Geelong.
- **ANOS Melbourne Suburbs Inc.**: PO Box 169, Bayswater VIC 3153 - Richard Johnson 04 7808 7752 4th Wednesday of month (excl. December), 7.30pm. Montrose Primary School, Leith Rd, Montrose 3765
- **ANOS Victoria Inc.**: PO Box 308, Boronia VIC 3155 - (03)9387 2771 1st Friday each month, 8pm. Toorak Uniting Church Hall, , 603 Toorak Rd, Toorak.

WESTERN AUSTRALIA

- **ANOS Western Australia Inc.**: Mrs Lyn Morgan, 99 Bywater Way, Wilson WA 6107 - (08)9451 2164 2nd Monday each month, 8pm. Wilson Community Hall, Braibrise Rd, Wilson.

NEW ZEALAND

- **ANOS New Zealand Native Orchid Group** 42 Titiro Moanna Rd, Korokoro, Lower Hutt 5012

D. (Lynette Banks x Yondi Tina) x *D.* Dunokayla, at the 2019 Kempsey Speciosum Spectacular. Photo Roslyn Capell